



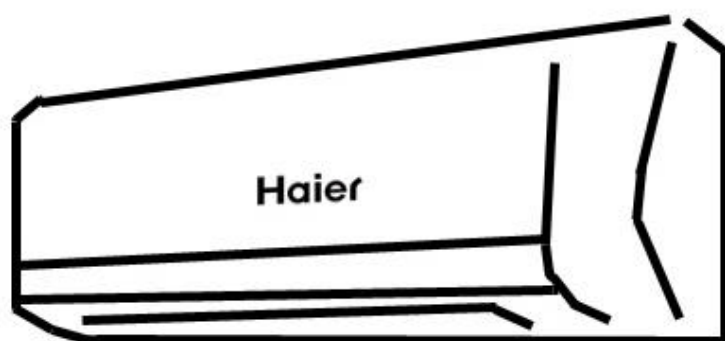
Domestic Air conditioner

SERVICE MANUAL

**HSU-09HSA03/R2(DB)
HSU-12HSA03/R2(DB)**

CAUTION

- READ THIS MANUAL CAREFULLY TO DIAGNOSE TROUBLE CORRECTLY BEFORE OFFERING SERVICE.
- THIS MANUAL IS USED BY QUALIFIED APPLIANCE TECHNICIANS ONLY.
- HAIER DOES NOT ASSUME ANY RESPONSIBILITY FOR PROPERTY DAMAGE OR PERSONAL INJURY FOR IMPROPER SERVICE PROCEDURES DONE BY ONE UNQUALIFIED PERSON.



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1. General information

This Service Manual describes the operation, disassembly, troubleshooting, and repair of Haier Room Air Conditioners, etc. It is intended for use by authorized services who troubleshoot and repair these units.

It is assumed that users of this manual are familiar with the use of tools and equipment used to troubleshoot and repair electrical, mechanical, and refrigeration systems; and understand the terminology used to describe and discuss them.

Haier urges you read and follow all safety precautions and warnings contained in this manual. Failure to comply with safety information may result in severe personal injury or death.

Related Publications

This is a base service manual, covering a range of similar models. It is intended to be used in conjunction with the Parts Manual and Technical Sheet covering specific model being serviced.

NOTE: General Precautions and Warnings

WARNING

To avoid risk of personal injury or death due to electrical shock, disconnect electrical power to unit before attempting to service the unit.

WARNING

To avoid risk of personal injury or death due to electrical shock, DO NOT, under any circumstances, alter the grounding plug. Air conditioner must be grounded at all times. Do not remove warning tag from power cord. If a two-prong (non-grounding) wall receptacle is encountered, contact a qualified electrician and have the receptacle replaced with a properly grounded wall receptacle in accordance with the National Electrical Code.

WARNING

To avoid risk of heat exposure, which may cause death or severe illness, air conditioner must be monitored when failures or shuts down.

WARNING

To avoid risk of personal injury or death due to electrical shock, grounding wires and wires colored like grounding wires are NOT to be used as current carrying conductors. The standard accepted color coding for ground wires is green or green with a yellow stripe. Electrical components such as the compressor and fan motor are grounded through an individual wire attached to the electrical component and to another part of the air conditioner. Grounding wires should not be removed from individual components while servicing, unless the component is to be removed and replaced. It is extremely important to replace all removed grounding wires before completing service.

MODEL: HSU-09HSA03/R2(DB)



Product Features

- Healthy negative ion
- Intelligent airflow
- Entire auto mode
- ESF filter
- Easy clean design

Main Specification

- Cooling Capacity: 2400W
- Power Input: 680W
- Current Input: 3.50A
- EER: 3.53
- Heating Capacity: 2650W
- Power Input: 730W
- Current Input: 3.8A
- COP: 3.63
- Air Volume(Indoor/outdoor): 400m³/h
- Power Supply: 1PH/230V/ 50Hz

MODEL: HSU-12HSA03/R2(DB)



Product Features

- Healthy negative ion
- Intelligent airflow
- Entire auto mode
- ESF filter
- Easy clean design

Main Specification

- Cooling Capacity: 3300W
- Power Input: 1078W
- Current Input: 4.9A
- EER:3.06
- Heating Capacity: 3600W
- Power Input:1230W
- Current Input: 5.4A
- COP: 2.93
- Air Volume(Indoor/outdoor): 450m³/h
- Power Supply: 1PH/230V/ 50Hz

2. Specification

Item		Unit	HSU-09HSA03 /R2(DB)	HSU-12HSA03 /R2(DB)
Power		PH, V, Hz	1, 230, 50	1,230,50
Climate Type			T1	T1
Starting Current		A	10	12
Cooling	Cooling Capacity	W	2400	3300
	Rated Power	W	680	1078
	Rated Current	A	3.50	4.9
	Max Power	W	870	1350
	Max Current	A	3.8	6.0
	EER	W/W	3.53	3.06
Heating	Heating Capacity	W	2650	3600
	Rated Power	W	730	1230
	Rated Current	A	3.8	5.4
	Max Power	W	1100	1480
	Max Current	A	4.4	6.8
	EER	W/W	3.63	2.93
Operating temp. range	Cooling	℃	18~46	18~46
	Heating	℃	-15~24	-15~24
Indoor fan Velocity	H	rpm	1150	1300
	M	rpm	950	950
	L	rpm	740	740
Outdoor fan Velocity		rpm	710	800
Indoor Air Volume (High)		m ³	400	450
Max. pressure at warm side		MPa	4.15	4.15
Moisture Removal		10 ⁻³ m ³ /h	0.83	1.2
Noise Level	Indoor (H/M/L)	dB(A)	42/40/38	42/40/38
	Outdoor	dB(A)	48	52
Indoor Weight	Net	Kg	8.6	8.6
	Gross	Kg	10.8	10.8
Outdoor Weight	Net	Kg	31	33
	Gross	Kg	34	36
Indoor Dimension	Net	mm	760×182×285	760×182×285
	Package	mm	837×282×312	837×282×312
Outdoor Dimension	Net	mm	780×245×540	780×245×540
	Package	mm	790×366×484	790×366×484
Compressor	Manufacture		TOSHIBA	SANYO
	Type		DA89X1C-20FZ	C-6RZ092H1A
	Oil Charge	ml	370	320

Refrigerant	Type		R410A	R410A
	Net Charge	g	800	1200
	Charge if over standard pipe length	g/m	12	12
Refrigerant Pipe	Liquid pipe Diameter	mm	6.35	6.35
	Gas pipe Diameter	mm	9.52	12.7
	Standard length	m	5	5
	Max length	m	15	15
Drain Hose	Length	mm	2000	2000
	Diameter	mm	16	16
Drainage pipe material diameter		mm	16	16
Remote Controller Model			YR-H04	YR-H04
Class of electric Shock Protection			I	I
Class of Water Proof			IP 24	IP 24
Power Cord (Model × Sectional Area)			H05VV-F 3G2.5mm ²	H05VV-F 3G2.5mm ²

3. Electrical control

I . Scope of Application

This specification use for HSU-09/12HSA03/R2 (DB) frequency conversion air condition are manufactured by Haier air condition parent company. "Setting value" (express in parameter) in this specification means is a parameter that is stored in EEPROM. Refer to [EEPROM parameter table].

1. Chip pin definition

This controller adopts MOTROLA MC68HC908 AB32; Chip each pin definition as following:

1	PTC4	door switch
2	IRQ	
3	RST	over-zero detection
4	PTF0/TACH2	remote control receiving
5	PTF1/TACH3	SDA
6	PTF2/TBCH2	SCL
7	PTF3/TBCH3	Buzzer
8	PTF4/TBCH0	Swing stepping motor A
9	NC	
10	PTF7	Swing stepping motor D
11	PTF5/TBCH1	Swing stepping motor B
12	PTF6	Swing stepping motor C
13	PTE0/TXD	network output
14	PTE1/RXD	network output
15	PTE2/TACH0	PG feedback
16	PTE3/TACH1	PG output
17	PTE4/SS	fresh air
18	PTE5/MISO	negative ion output
19	PTE6/MOSI	self check/ decrease time
20	PTE7/SPSCK	empty
21	VSS	GND
22	VDD	VCC
23	PTG0/KBD0	ultraviolet ray A
24	PTG1/KBD1	empty
25	PTG2/KBD2	empty
26	PA0 selection panel 1	sliding stepping motor A
27	PA1 high/low drive model	sliding stepping motor B
28	PA2 large/small model	sliding stepping motor C
29	PA3 A/B code selection	sliding stepping motor D
30	PA4 panel selection 2	pushup stepping motor A
31	PA5	pushup stepping motor B

32	PA6	pushup stepping motor C
33	PA7	pushup stepping motor D
34	PTB0/ATD0	output outdoor communication
35	PTB1/ATD1	input outdoor communication
36	PTB2/ATD2	room temperature
37	PTB3/ATD3	inner coil
38	PTB4/ATD4	swing left stepping motor D
39	PTB5/ATD5	swing left stepping motor C
40	PTB6/ATD6	swing left stepping motor B
41	PTB7/ATD7	swing left stepping motor A
42	PTD0	swing right stepping motor D
43	PTD1	swing right stepping motor C
44	VDDAREF	VCC
45	AVSS/VREFL	GND
46	PTD2	swing right stepping motor B
47	PTD	swing right stepping motor A
48	PTH0/KBD3	central control input
49	PTH1/KBD4	central control output
50	PTD4/TBCLK	empty
51	PTD5	G/V LCS K health H heat
52	PTD6/TACLK	G/V WR K operation H dry
53	PTD7	G/V DA K power supply H cool
54	VREFH	VCC
55	VDDA	VCC
56	VSSA	GND
57	CGMXFC	
58	OSC2	
59	OSC1	
60	PTC0	emergency switch
61	PTC1	empty K timer
62	PTC2/MCLK	G/V green light K green light H operation
63	PTC3	G/V blue light K blue light H timer
64	PTC5	G/V red light K red light H health

II. Temperature adjustment function

2.1 During temperature adjustment function, the operation frequency of outdoor unit will be based on indoor temperature and the set temperature.

When air capacity operates automatically; the indoor fan will be controlled on the basis of the requirements of temperature adjustment.

When the unit operates to make heat, the indoor wind unit will be controlled based on scrolling temperature.

2.1.1 Standard of temperature sensor under indoor environment.

When the line is in short circuit or open circuit, the indicator light will be alarming and the indoor fan motor will be off. It will resume to the original state automatically after it returns normally, and operates as usual.

Short circuit:

Temperature: above 126 degrees,

Hex: Above F8H,

Value of Resistance: Below 0.65K, above 4.85V.

Normal temperature:

Temp: 25 degrees,

Hex: 40H,

Value of Resistance: 23K,

Voltage: 2.33V.

Power failure:

Temp: below -31 degrees,

Hex: below 08H,

Value of Resistance: Below 620K,

Voltage: Below 0.15V.

B parameter=4200

R (25degrees) =23K

2.1.2 Value of Resistance of indoor temperature sensor is ignored, when the heat mode is ON and the indoor fan is OFF, as well as after warm start indoor fan operate for 30 seconds. (in order to avoid affection of heat exchanger)

2.2 When frequency increase to holding frequency

In order to oil return fully during operating, the system will must keep some frequencies for a period of time.

Time Indication			Frequency indication
Drying in cool mode	Heat	Defrosting in heat mode	Holding frequency
60 seconds	60 seconds	30 seconds	58Hz

After Forced operation OFF at the start status, system will begin to control the temperature area.

2.3 Preset temperature correction

The preset temperature is corrected according to the operating mode, air capacity and forced operation status.

Only in the heat mode to correct the air capacity, confine to the low and middle speed of the air capacity.

Corrected value table for preset temperature:

Mode	Corrected contents	Corrected variable	Corrected parameter
Heat	Correct the operating mode	ETBL0	4.67℃
	Correct forced operating mode	ETBL1	6℃
	When the air capacity is low to correct it	ETBL2	4.67℃
	When the air capacity is low to correct it	ETBL3	4.67℃
Cool and dry mode	Correct the operating mode	ETBL4	-0.33℃
	Correct the forced operating mode	ETBL5	-4℃

2.4 Control the temperature the area

2.4.1 Deviation

Calculation the deviation of the temperature area, as following:

Heat: $E = (\text{remote control preset temperature} + \text{corrected value}) - \text{room temperature}$

Cool and dry: $E = \text{room temperature} - (\text{remote control preset temperature} + \text{corrected value})$

2.4.2 Compressor OFF (OFF)

When E is negative and $|E| > ?T$:

	Heat		Cool	
?T	TCH AHL	0.67	TCH ACL	0.33
After ?T variation	TCH AHH	0.67	TCH ACH	1
?T variation condition	When the system is start to operate, $E = 3.0^{\circ}\text{C}$,			

The compressor will be stopped after detected continuously for 120 seconds.

After operation starts, when compressor turns off at the first time, based on the above conditions, the unit should operate according to ?T variable data. Between the time when compressor is off and restarts, the unit should operate on ?T starting data (Except dry) and operating mode is transferring. (Except the case that waiting unit is off). Compressor starts when the wrap E is larger than $-?T$. When compressor is operating and the set temperature by the remote control changes in the orientation that compressor is off, in addition, it is below $-?T$, compressor will be off.

2.4.3 Compressor operating

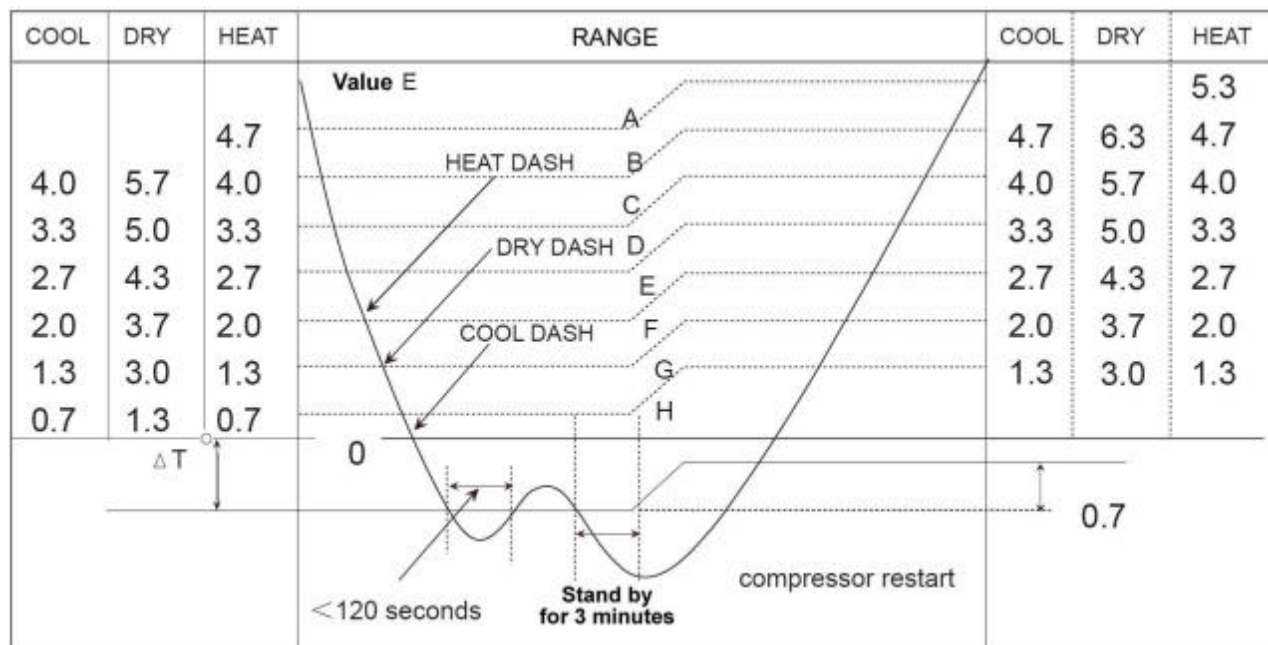
During the time when compressor is off, after waiting for 3 minutes, the deviation E is much larger than $-\Delta T + 0.67^{\circ}\text{C}$, compressor will start to operate.

2.4.4 DASH operation

When the system starts to operate or to switch the operation mode (except compressor first to off and then to on), when the compressor is on, the system will indicate the maximum frequency satisfied condition as following:

Cool deviate to 0
 Dry deviate to G area
 Heat deviate to F area

When the system is in test run, emergency operation, silencing operation mode, the DASH will be stopped.



2.4.5 Temperature adjustment section (DASH operation condition in the different mode)

2.4.6 Frequency in the different mode

In this area, the frequency (from indoor to outdoor) indication as following:

When the system is in the cool and dry mode, the frequencies between A area and B area are same.

In the silencing operation mode, the frequencies between A-E area and F area are same.

	Indication frequency	Scope of frequency	Temperature changing area
Heating	FQHOT [0—7]	30-140Hz	A—H
Heat in Silence mode	FQSHOT [0—2]	30-72Hz	F—H
Dry	FQDRY [0—7]	30-98Hz	B—H
Cooling	FQCOOL [0—7]	30-98Hz	B—H
Cooling in silence mode	FQSCOO [0—2]	30-64Hz	F—H

The maximum frequency is the maximum frequency value as above table.

The max or min frequency in the cool or heat mode is corresponding with the max or min frequency value as the above table.

2.4.7 Control frequency in the same area

The compressor operating by the identity frequency for 3minutes that its area has no change, the indication frequency will be changed.

The timer will be reset when you input the different frequency. The system's temperature area have no change when the system operating by new frequency for 3 minutes, please changing its indication frequency (add FQUPH or FQUPL).

Controlling table in the identity area:

	Temperature change area							
	A	B	C	D	E	F	G	H
Heat			FQUP(2Hz)	FQUP(2Hz)	FQUP(2Hz)	FQUP(1Hz)	FQUP(1Hz)	
Cool and dry			FQUP(2Hz)	FQUP(2Hz)	FQUP(2Hz)	FQUP(1Hz)	FQUP(1Hz)	

FQUPH: 2Hz; FQUPL: 1Hz

2.4.8 Air capacity decision when Air capacity is running automatically.

When air capacity is running automatically, based on temperature adjusting sections, you shift the switch for air capacity, namely, enhanced, middle, and weak.

When air capacity is running automatically, shown following air capacity table.

H---High M---Middle L---Low

	Temperature adjustment section								
	A	B	C	D	E	F	G	H	I
Heat	H	H	H	H	H	M	L	L	SL O
Cool		H	H	H	M	M	L	L	L
Dry		H	M	M	M	L	L	SLO	SL O

2.5 Defrost

When the high load precaution control operating, the priority is precaution control operating.

Compressor is not off.

During the heat-making operation, communication of outdoor unit will deliver defrosting signal (I21=10), indoor unit will be based on defrosting controlling. It will continue until communication of outdoor unit delivers defrosting released signal (I21=01), indoor unit will be on heat-making operation directly. Air capacity will be of under the temperature controlling section of heat making.

2.6 Air capacity limited

During compressor operating, when the maximum speed of indoor fan be set middle or low speed, the upper limit of indication frequency shown respectively as following:

Frequency number of air capacity limit table:

	Limiting frequency variable	Limiting frequency
Air capacity middle limit	FQLIMMD	90Hz
Air capacity low limit	FQLIMLO	52Hz
Upper and down limit of fresh air capacity frequency	FUPHEAL	30Hz

Estimate the limiting frequency condition in heat mode; first, estimate it whether is the limiting frequency condition of set low fan or health fan. If there have set low fan, health fan or both of them, to

correction the limit frequency according to the following condition:

Outdoor temperature condition	Indication frequency	
011(20℃more than)	Low fan or health fan limited frequency	48Hz
010(15-20℃)	Low fan or health fan limited frequency +FUPHEA1	50Hz
001(10-15℃)	Low fan or health fan limited frequency +FUPHEA2	52Hz
000(10℃downward)	In general frequency	

III. Indoor fan motor control

Objective revolutions:

			HSU-09HSA03/R2 (DB)	HSU-12HSA03/R2 (DB)
		Rotate speed variable	variable(rpm)	variable(rpm)
Heating	Weak	FRPMTBL00	700	700
	Silencing SSLO	FRPMTBL01	820	820
	Low	FRPMTBL02	950	950
	High	FRPMTBL05	1200	1300
	Automation	Low	FRPMTBL04	950
		High	FRPMTBL05	1200
Cool	Weak	FRPMTBL06	740	740
	Silencing SSLO	FRPMTBL07	840	840
	Low	FRPMTBL08	950	950
	High	FRPMTBL11	1150	1250
	Automation	Low	FRPMTBL10	950
		High	FRPMTBL11	1150
Aeration	Low	FRPMTBL12	950	950
	High	FRPMTBL13	1150	1200
Rating	Cool	FRPMTBL09	1200	1250
	Heating	FRPMTBL03	1200	1250

When air capacity is set for controlling by hand; it is the revolution of (High + Low)/2.

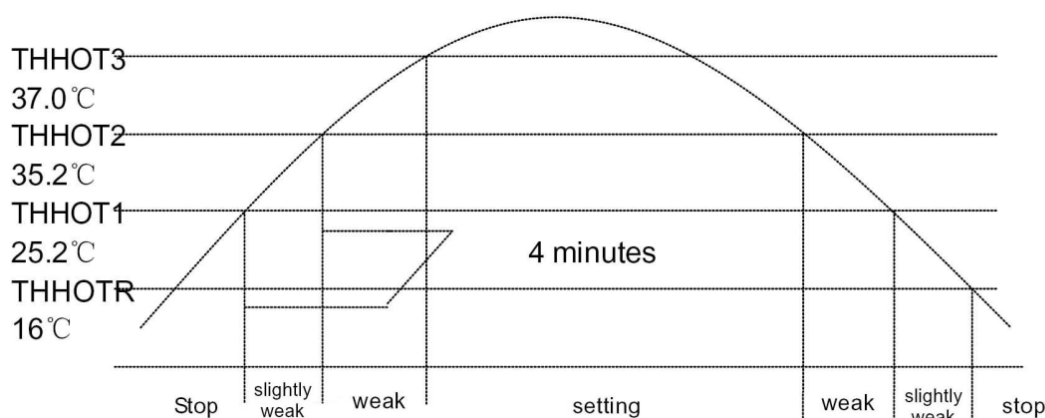
When it runs automatically, it is the revolution of (automatically high + automatically low)/2. (No account the revolution when it doesn't reach 10rpm)

3.1 Heat operation

3.1.1 Warm start

A, Control cool air during heating:

Heat exchange temperature:



Based on the heat exchange temperature to control the indoor fan as the above shown.

1. When the heat exchange temperature rise, to distinguish the fan speed based on the heat exchange temperature:

The heat exchange temperature is less than 35.2°C, the speed of fan motor is weak (for the first power on, when the system operating in heat mode or OFF the defrost mode, and when the heat exchange temperature is less than 25.2°C, the fan motor will OFF; if the temperature is between 25.2°C and 35.2°C, the fan motor will be weak speed operating);

The fan motor operating with low speed when heat exchange temperature is between 35.2°C and 37°C;

The heat exchange temperature is more than 37°C, fan motor operating by the set speed.

2. When drop of the heat exchange temperature, to distinguish the fan speed based on the heat exchange temperature:

The fan motor operating with low speed when heat exchange temperature is between 35.2°C and 25.2°C;

The fan motor always operates with little-low speed when heat exchange temperature is less than 25.2°C. (for the first power on, when the system operating in heat mode or stopping the defrost mode, and when the heat exchange temperature is between 25.2°C and 16°C, the fan motor will operating with weak speed; when the temperature is drop down to under 16°C, the fan motor will be stopped.)

3. During the heat exchange temperature is rising, fan speed is in the weak and low speed status, if the heat exchange temperature don't return to previous value after 4 minutes, the fan speed will rise and continuously operating by the set temperature for 4 minutes, the system will adjustment the fan speed based on the heat exchange temperature;

4. When the heat exchange temperature is dropping down, the fan speed will go up to the set speed if the fan motor operate continuously by the low speed for more than 4 minutes.

3.1.2 Compressor OFF and waiting for 3 minutes

1. The compressor is OFF (the flamestat is OFF), the air capacity will change from small to little small after 20 seconds (is SSLO in silence mode);
2. To heat operating in stand-by time (when the mode switch, the compressor will OFF), the air capacity keep to weak.
3. Power off by remote control, then the indoor fan motor will OFF.

3.1.3 Compressor restart

It is set air capacity by remote control after the system warm start.

System will be based on the temperature to determine its ventilation.

Reference the control function in temperature area.

3.1.4 Defrosting operation

Fan motor is off after being low for 20 minutes.

The system received command from the outdoor unit communication I21=11 during low temperature and defrosting in heat mode to control the air capacity, it is the same with through the heat exchange temperature transducer go to warm start to control. (3-1-1).

After defrosting operation, if the compressor is on, the system will go to warm start to control the air capacity. If compressor is off, the air capacity is weak.

3.2 Cool operation

When set the air capacity is high, middle and low which represents its air capacity separately.

When air capacity is running on automatically, it is based on temperature.

Refer to Temperature adjustment Functions. (reference 2-4-8)

3.3 Dry operation**3.3.1 Compressor OFF and waiting for 3 minutes**

When the compressor is OFF, the fan motor will stop.

It will switch to weak after wait for 3 minutes.

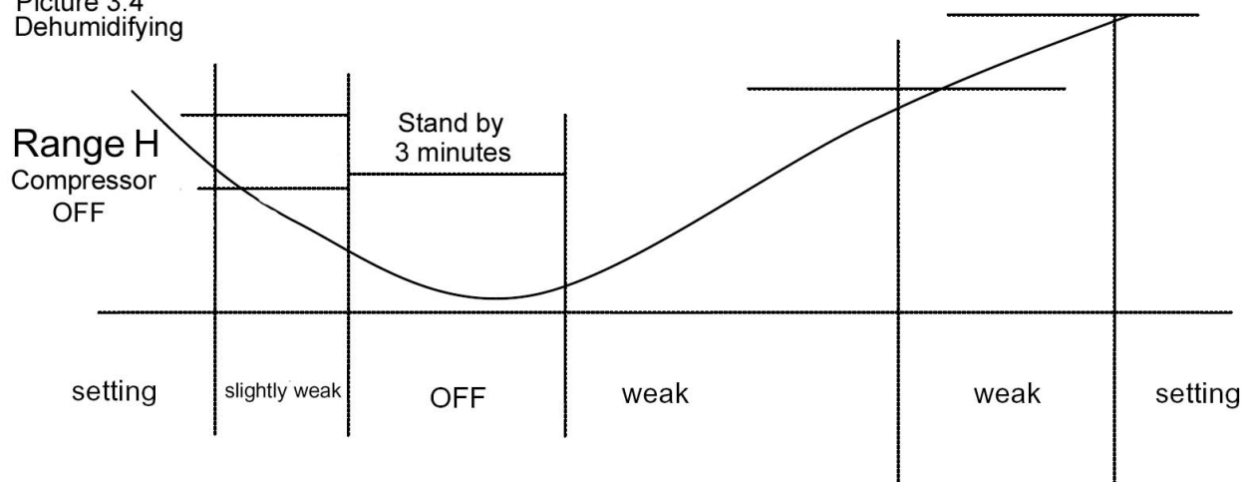
The compressor will change to ON after wait for 3 minutes, and it will in the on-control mode.

3.3.2 Compressor ON

When the air capacity is set High, Middle and Low, the compressor will operate by the set mode.

When the air capacity is set auto fan, the air capacity will be adjusted by the temperature.

Picture 3.4
Dehumidifying



IV. Enhanced operation

Enhanced operation will continue for 15 minutes.

Enhanced operation will finish if the operation is off or after 15 minutes.

Enhanced operation will finish when the status be changed.

Enhanced operation will finish if the unit enters the status of "silence", operates normally or on-timer signal control.

In the auto mode, there are enhanced /silence function; the main unit operating is based on enhanced cool /silence function in the cool mode; the main unit operated by the enhanced heat/silence function in the heat mode; the main unit will operate is based on no-enhanced/silence function in the fan mode.

4.1 Enhanced heat

Modify the set temperature. It has temperature-adjustment function.

Air capacity will be automatic middle fan speed.

When operating for defrosting, outdoor unit will not receive the communication signal of enhanced operation. After operation for defrosting, the system will operate enhanced function only in the remaining time.

After enhanced operation continues for 15 minutes, compressor is forbidden to be OFF for 10 minutes. (Except the error)

4.2 Enhanced Cool

Modify the set temperature. It has temperature-adjustment function.

The high air capacity will be set for hand controlling.

After compressor starts, it's not on the low load protection within 3 minutes.

4.3. No enhanced function for fan and defrosting mode.

V. Silence operation

Send silence operation signal to outdoor unit.

5.1 Heating in the silence mode

When compressor is on, air capacity is SSLO.

When compressor is off, air capacity is SSLO within 20 seconds, and then it changes to be tenuity.

5.2 Cooling in the silence mode

Air capacity is SSLO.

5.3 No silence functions during dry operating and fan operating in the silence mode.

VI. Fresh air

After the system receives remote control command, the negative ion generator will be activated to emit the negative ion if the fan motor is operating.

When the fan motor is OFF, the negative ion generator will OFF.

When the negative ion generator is OFF, if the fresh air mode is ON, the fan motor operating again and the negative ion generator will ON automatically.

VII. Timer operating

Use the timer to time counting is according to the time difference between time clock and current time. During timer operating, the timer indicator light will light.

7.1 Timer off

When the timer is off, the character display of the panel running status does not change, once the timer time is time-up, its operating will OFF.

7.2Timer ON

When the timer is ON, the panel only displays the timer character, once the on-timer time, the system will operate start by the set mode.

7.3 Timer ON/OFF

The executing order is based on the direction from the board.

VIII. Sleep operating

8.1 During cool/ dry operation, the fixed temperature will rise by 1°C after it operates for 1 hour. After another hour the temperature will rise by another 1°C. After 6 hours, the unit is off.

8.2 During heat-making operation, the fixed temperature will rise by 2°C after 1 hour. After another 2 hours the temperature will rise by 2°C. The temperature will rise by 1°C after three hours. After the last 3 hours, the unit is off.

8.3 Indoor fan unit will be high fan before the unit is set for sleeping state. After it is set for sleeping state, fan speed indoors will change into middle fan speed. If indoor fan unit is middle fan speed before it is set for sleeping state, fan speed indoors will change into low fan after it is set for sleeping state. If indoor unit is low fan before it is set for sleeping state, fan speed indoors will keep the same.

IX. Automatic operation

The automatic operation is divided into automation and full automation by use the variant selection mode.

9.1 Automation operating mode:

Automation operating is on, MCU will select corresponding operation mode based on the room temperature to preserve the set temperature (set temperature is 23°C in the heat mode; it is 26°C in the cool mode).

For the first power on, if the indoor temperature $T=23^{\circ}\text{C}$ the system will operate in the heat mode, $T>23^{\circ}\text{C}$ operating in the cool mode.

The system will perform the heat program in the heat mode (set temperature is 23°C), when system temperature arrive at stop value of compressor, the compressor to off and waiting for 3 minutes; after the compressor stop continuance for 15 minutes, if the system detected the ventilation temperature is more than 23°C, it will enter cool mode, or else it will continuously operate in the heat mode.

When enter the cool mode and the system operating in cool mode (set temperature 26°C), the compensation temperature contrast will be canceled automatically, when it arrive at the stop temperature of the compressor, the compressor to off and wait for 3 minutes; after the compressor stop continuously for 15 minutes, the system detected the ventilation temperature $T=23^{\circ}\text{C}$, then it will enter heat mode and automatically add the compensation temperature. or else it will continuously operate in the cool mode.

When the system switch from other mode to auto mode, if the operation status change (i.e. first determine and then operation), it will stop for 3 minutes and then determine temperature based on the indoor ventilation temperature.

9.2 Full-automation operation

After system is on and the operation mode will switches to auto mode, the system determine operating mode by the difference between current set temperature and the room temperature, and then operate in the determined mode. In the following selection condition, T_r indicate room temperature, T_s indicate set temperature.

In First enter auto mode, select operating mode as following condition:

$T_r = T_s - 3^{\circ}\text{C}$	select cool mode
$T_r < T_s - 3^{\circ}\text{C}$	select heat mode

When system enter the auto mode, the operation mode will switch between cool and heat according to change of the indoor temperature: if the unit operating in the cool mode, when system temperature arrive at stop value of compressor, the compressor to off and stop continuously for 15 minutes, and then to detect the room temperature, at this point, if $T_r < T_s - 3^{\circ}\text{C}$, then the system enter the heat mode, otherwise it will operate continuously in the cool mode; if the unit operating in the heat mode, when system temperature arrive at stop value of compressor, the compressor to off and stop continuously for 15 minutes, and then to detect the room temperature, at this point, if $T_r > T_s + 3^{\circ}\text{C}$, then the system enter the cool mode, otherwise it will operate continuously in the heat mode.

This mode has timer and sleep function, if the system enter the cool mode, then enter the cool+ sleep mode, if enter the heat mode then enter heat + sleep mode.

Select swing or sticking on one position for the fan blade, and fan speed including: low, middle, high and auto fan, you can select any one of them without control.

X . Running-in

In the Running-in mode the indication frequency is 58Hz, the air capacity is enhanced.

Running-in is off after 30 minutes. When the system received the remote control signal in the running-in mode, the system will exit this mode.

No taking activities under low load protection.

X I . Low load protection controlling

The standard of heat alternating temperature sensor

B destiny=3700 R (25 degrees) =10KO

When it operates for coolness making or defrosting, low load protection will be taken based on Heat exchange temperature as the following picture shows

Controlling under low load protection

If selection model is GANGDA communication, the indoor unit have not this function.

Heat exchange temperature sensor format:

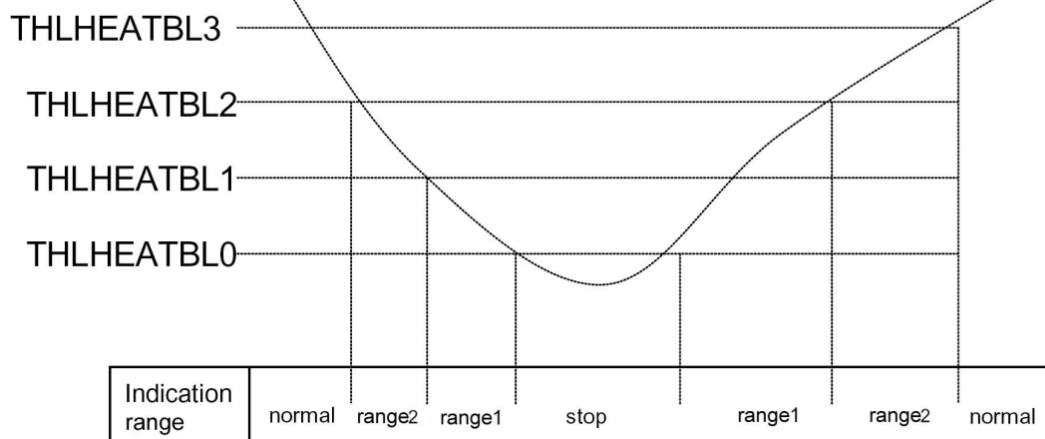
Fixed number B =3700 R (25 degree) =10KO

In Cool\Dry operation mode, the unit performs low load protection operating according to Heat exchange temperature as following figure show.

Low load protection control

Picture 11.1

Heat-exchange temperature



When it is on running-in process, low load protection controlling will be ignored.

After enhanced cool operation start, release temporarily the low load protection control for 3 minutes.

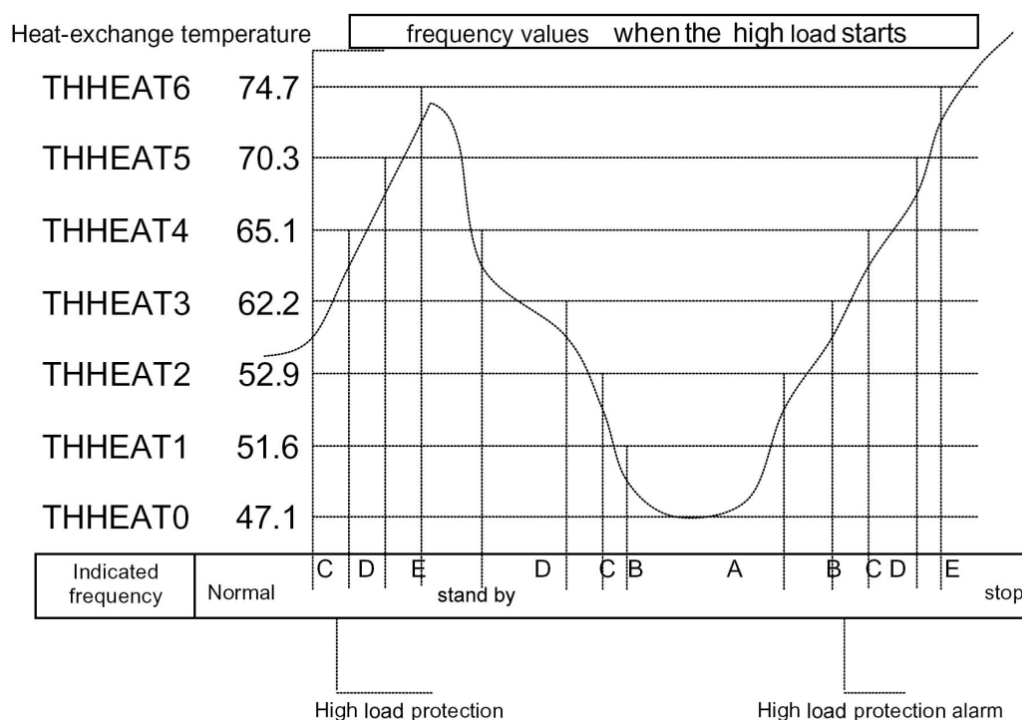
(THLH[3, 2, 1, 0]= 7℃ , 4.6℃, 2.2℃, -0.5℃)

XII High load protection control

If selection model is GANGDA communication, the indoor unit has not this function.

In heat operation mode, the unit performs high load protection operating according to Heat exchange temperature as following figure show:

When operating for heat, the unit is under high load controlling based on Heat exchange temperature as the following picture shows.



High load protection activities are limited twice within 30 minutes, and then high load protection starts to be alarming.

When Heat exchange temperature doesn't reach "THHEAT[2]", the unit will return to state of normal temperature area control.

The lesser value of High load frequency and area frequency is used for the operation data.

XIII. low temperature treatment in the heat mode

If the case that four-direction valve couldn't be switched, or the compressor restarts except the defrosting mode in the heat operation, if the temperature of heat exchanger keeps below "THHOTLTH" (-4.5°C) for "TMHOTLTH" (90 seconds), compressor will be off and wait for 3 minutes. Heat exchange temperature higher than "THHOTLTH" (-4.5°C) will reset.

XV. EEPROM control

When outdoor power on, if the value unconformity between total parameter of EEPROM and check sum, indication the EEPROM disorder.

Indoor received disorder signal of EEPROM from outdoor, indicating outdoor EEPROM disorder.

Control and emergency operating does not be received.

Cancel it by power OFF only.

X VI. Error list record

It indicates nothing if error code has not is recorded.

Fault signal show for 10s to auto off.

Remote control only receives the 'off' signal. Based on the 'on/off' or off signal of remote control, the error list will stop show.

Have component of EEPROM, after power on again, the list will be recorded.

X VII. Special function

1. Indoor unit single operating

a. Enter conditions: The system be set high heat mode by remote control, set temperature is 30°C, power on for the first time, press the sleep key 6 times in 7 seconds, the buzzer resound 6 times.

b. Enter indoor unit single operation mode, indoor unit processing as following program:

Indoor unit operating and communication in set mode, it will not process communication signal of outdoor but send communication signal to outdoor continuously.

c. Exit condition: Once the system received remote control off or emergency off signal, it will exit indoor single operation status; when power fault, once power on it will exit single operation mode.

During indoor single operating, simulation outdoor send following information to indoor:

Output frequency 58 Hz, error defrosting status is 17654=0001, 13=0,121=01, outdoor temperature elever K54=00, indoor heat exchange temperature fixed to 47degree.

2. Power failure compensation

a. enter condition: press the sleep key 10 times in 7 seconds, the buzzer resound 4 times, simultaneity , store the current operation status into EEPROM of indoor unit.

b. Enter indoor unit power failure mode, indoor unit processing as following program:

Remote control the emergency signal, unit will operate according to the remote controller and emergency set status and store the current operation status into indoor EEPROM.

Main unit operating based on the panel set status and store the current operation status in EEPROM.

Enter power failure compensation, power restart, main send the current status and power failure compensation signal to indoor panel, once the panel received to reply information and keep power failure compensation bit.

c. exit condition: Press the sleep key 10 times in 7 seconds, the buzzer resound 2 times.

d. Set timer and sleep at power failure compensation status; after power restart, the main unit memory status is 'off' status.

2. Rating operating

①rating cool:

- a. G code enter condition: high speed cool, set temp. is 16°C, press temperature “-” key and set key together, enter mode after resound 2 times.
- b. then operate as following:
Enter rated frequency operation mode; panel shown cool status; in communication rated shown.
- c. Exit condition: Exit rated operate mode and enter remote control set status after received remote control signal.

②middle capacity:

- a. G code enter conditions: High fan cool, set temp. is 16°C, press 4 times continually in 7s, Enter rated frequency operation; Panel show cool status; have ration in communication.
Reso Enter rated frequency operation; Panel show cool status; have ration in communication.
Resound 5 times.
- b. then operating as following: enter middle capacity rated frequency operating;
- c. Exit condition: Exit rated operate mode and enter remote control set status after received remote control signal.

③min capacity cool:

- a. G code enters condition: remote control high fan cool, set temp. is 16°C, press 8 times continually in 7s, resound 7 times.
- b. then operating as following: enter min capacity rated frequency operating; panel show cool status; have ration in communication.
Enter rated frequency operation; Panel show cool status; have ration in communication.
- c. Exit condition: Exit rated operate mode and

④rated heat: rating heat

- a. G code enter condition: high speed cool, set temp. is 16°C, press temperature “-” key and set key together, enter mode after resound 2 times.
- b. Then operation as following program:
Panel show heat status; have ration in communication.
Enter rated frequency operation; Panel show cool status; have ration in communication.
- c. Exit condition: enter remote control set status after received remote control signal.

⑤middle capacity heat:

- a. G code enters condition: Remote control high fan heat, set temp. is 30.7°C, press 4 times continually in 7s, resound 7 times.
- b. Then operation as following program: panel show cool status; have ration in communication.
Enter rated frequency operation; Panel show cool status; have ration in communication.
- c. Exit condition: Exit rated operate mode and enter remote control set status after received remote control signal.

⑥min capacity heat:

- a. G code enters condition: Remote control high fan heat, set temp. is 30°C, press 8 times continually

in 7s, resound 7 times.

b. Then operation as following program: Enter min capacity rated frequency operation; panel show cool status; have ration in communication.

Enter rated frequency operation; Panel show cool status; have ration in communication.

c. Exit condition: Exit rated operate mode and enter remote control set status after received remote control signal.

X VIII. Fault explain

LCD fault code

Indoor unit fault code:

Fault code	Contents	Remark
E1	Room temperature sensor fault	
E2	Heat exchange sensor fault	
E3	Total current Over Current	Use in split unit
E4	EEPROM error	
E5	Cool icing	
E6	Reset	
E7	Communication fault(between indoor and outdoor unit)	
E8	communication between panel and indoor unit	
E9	High load protection	
E10	Humidity Sensor	
E11	Stepping motor fault	
E12	High voltage static electricity apparatus	
E13	Power off moment	Heat overload
E14	Indoor fan motor fault	
E15	Central control fault	
E16	High voltage electrostatic dust collection fault	
E17	reserved	
E18	reserved	
E19	reserved	

Outdoor unit fault code

Fault code	Contents	Remark
F1	Module fault (overheat, over current, short circuit)	
F2	No load	
F3	Communication fault	
F4	Compressor overheat	Ventilation temperature protection
F5	Total current Over Current	

F6	Ambient temperature Sensor fault	
F7	Heat exchange Sensor	
F8	Fan unusual start	
F9	PFC protection	
F10	Cool overload	
F11	Compressor rotor circuit fault	
F12	Outdoor EEPROM error	
F13	Compressor forced switching failure	
F14	Fan hall element fault	
F15	Fan IPM overheat	
F16	Fan over current	
F17	Single-chip microcomputer ROM badly	
F18	Power supply over voltage protection	
F19	Power supply under voltage protection	
F20	Pressure protection	
F21	Defrosting temperature Sensor unusual	
F22	AC current protection	
F23	DC current protection	
F24	CT broken line protection	
F25	Ventilation temperature Sensor	
F26	electron expansion valve fault	
F27	reserved	
F28	reserved	
F29	reserved	

XIX Emergency switch

When power off, press emergency switch less 5s to start emergencies operating.

When power off, Press the emergency switch in 5s-10s to start running-in.

When power off, continues Press the emergency switch in 10s-15s to indicate last fault.

When power off, Press the emergency switch, the panel shown auto mode.

When power off, continues Press the emergency switch in 15s or at hand leave switch, unit don't receive the remote control.

More than 15s, unit enter "Off" status

More than 15s, unit can received signal

During operating, press the emergency switch may be power off.

Occur unusual circumstance, press this switch to off or cancel the unusual mode.

When occur fault, press this switch to off the fault indication.

During operating, occur normal or unusual circumstance (e.g. touch switch to short circuit) or in the fault status, press and continues emergency switch (pressing for a long time), the unit received signal also.

Failure list express mode:

Press switch for 10seconds, resound 3times, free it to enter fault list express mode; press switch for

15s panel indicator extinguish, failure list express mode be canceled.

Previous alarm information sent to display panel to indicate operating status.

After 10s, cancel fault indicator (fault list indicator show for 10s only).

During showing the fault status, don't receive other signal.

In normal mode, nothing is shown only buzzer sound.

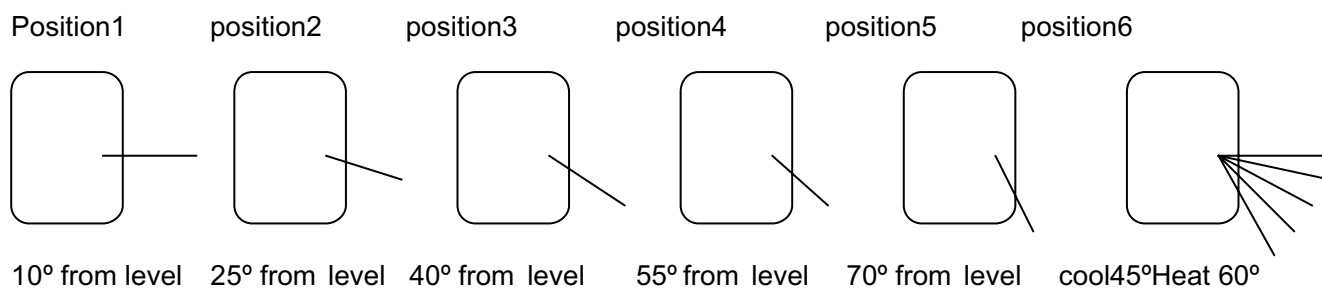
XX Air deflector control

20.1 Vertical swing

20.1.1 During power on, the entire output parts act along close direction.

20.1.2 Set position, after power restart and initialize, direct to remote control position.

20.1.3 Louver position



20.1.4 Dispose on swing of remote control.

20.1.4.1 The swing will move in the following direction when the unit is cool/ dry/ fan. Position 1 (Initial position)---position 2---position 3---position 4-----position 5 -----position 6---.circulating

20.1.4.2 The swing will move in the following direction when the unit is making heat:

Position 5 (Initial position)----position 4 ----position 3 ---position 2--- position 6 ----position 5circulating.

20.1.5 Dispose on swing indoor.

20.1.5.1 The unit will execute according to board indication when the unit is cool/heat/ dry.

When it runs under automatic mode, the host unit will enter heat-making mode based on indicated position of the board. When it runs under automatic mode, host unit has no position (After receiving the mode of position 5, the unit will dispose the data based on position 4).

20.1.5.2 When operation is off.

When operation is off or timing is on, all-close output parts will move into close direction.

When all-close output starts to operate, namely, it will move into open direction.

20.1.5.3 Trigger delay

During running-in, it is the standard position for cool mode. During emergency operating, by indoor to

measure standard position for enter cool /heat mode.

When operate starting, alarming to keep current position.

Received ventilated direction command delay 1s processing

Setting position range

Cool/dry: Pulse scope 45 degree

Heat: Pulse scope 60degree

During operating in closed cycle, it will move into open direction.

Swing-blade operating stop, keep the last output phase of excitation (1 phase); when unit operating stop (all close), all of 4 phase close.

In the set range, back and forth move, the acting is foreign to ON/OFF of temperature sensor.

Cool/dry: Pulse scope 45degree.

Heat: Pulse scope 60degree.

At the both points waiting for 0.5s to return.

Received signal of stop operating or change direction, cancel swing mode.

During swing, appears alarm, the swing will continues.

During start operating, confirm adjustment position that is foreign to on/off of temperature sensor

When stop, move from current position to full close.

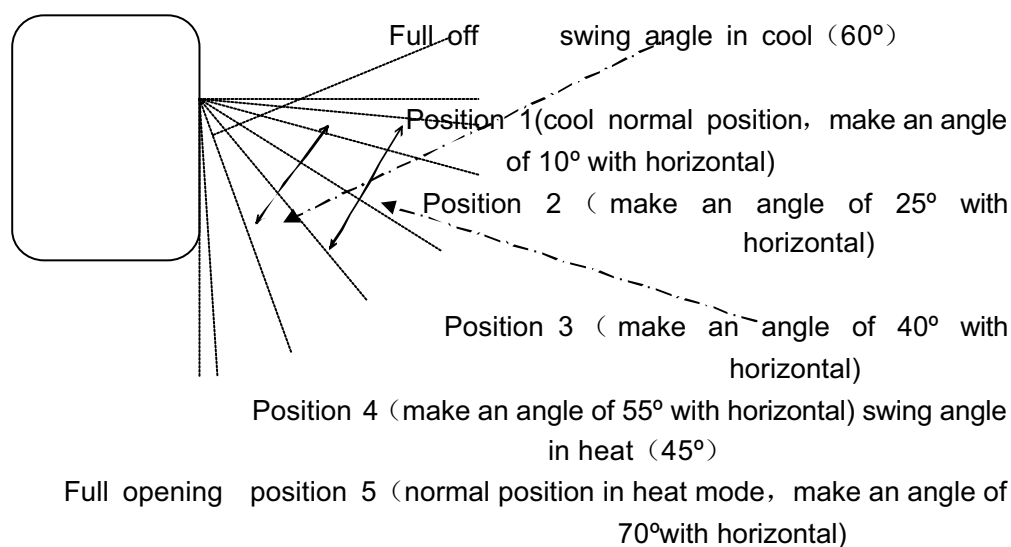
When switch mode, based on the position of panel send.

Under fixed position mode, alarm position keeps in the current position.

During heat swing, when switch to cool mode by the received signal, its acting position based on indicator of remote control.

Adjust position based on the received contents, no delay 1s.

Up/down swing:



Reference position

Swing angle in the cool and dry mode: 45°

Swing angle in the heat mode : 60°

20.2 Horizontal swing

20.2.1 When power on, system all of the output act along the close direction and then to middle position.

20.2.2 In the set position, due to power restore and initialization, the initial value is at the central vertical position (standard position).

During swing, louver stop operating based on the fan direction and its position is the remote control set position.

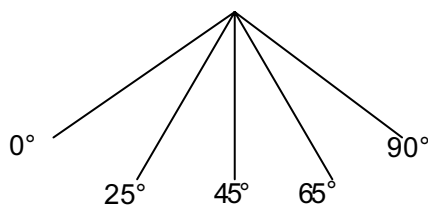
20.2.3 Operating mode for the ventilation position is set according to the indication of remote control and remote control set mode, except timer-on mode.

20.2.4 When start operating, to the set position by remote controller.

20.2.5 Fixed position mode, louver stop swing at position that the remote controller send.

20.2.6 Swing mode

Swing range as following:



Position1---45°

Position2---22.5,67.5°

Position3---0,90°

Position4---0°

Position5---22.5°

Position6---67.5°

Position7---90°

Position8---0°—— 90°

When swing from-to, stop about 0.5 seconds.

When the operation off or timer-on all of the output of system act along the close direction and then to middle position.

4. Thermistor resistance chart

Room temperature sensor

Temp. (°C)	R (KΩ)	Power Input (V)
-20	281.34	0.33
-19	263.56	0.35
-18	247.84	0.37
-17	231.66	0.40
-16	217.35	0.42
-15	204.02	0.45
-14	191.61	0.47
-13	180.04	0.50
-12	169.24	0.53
-11	159.17	0.56
-10	149.77	0.59
-9	140.99	0.62
-8	132.78	0.65
-7	126.11	0.69
-6	117.93	0.73
-5	111.22	0.76
-4	104.93	0.80
-3	98.04	0.84
-2	93.52	0.88
-1	88.35	0.92
0	83.50	0.97
1	78.94	1.01
2	74.67	1.06
3	70.65	1.10
4	66.88	1.15
5	63.33	1.20
6	60.00	1.25
7	56.88	1.00
8	53.91	1.35
9	51.15	1.41
10	48.51	1.46
11	46.04	1.51
12	43.72	1.57
13	41.52	1.63
14	39.45	1.68
15	37.50	1.74
16	35.66	1.80
17	33.92	1.85
18	32.27	1.91

19	30.72	1.97
20	29.25	2.00
21	27.85	2.09
22	26.54	2.15
23	25.30	2.21
24	24.12	2.27
25	23.00	2.33
26	21.94	2.38
27	20.94	2.44
28	19.99	2.50
29	19.09	2.56
30	18.23	2.62
31	17.42	2.67
32	16.65	2.73
33	15.92	2.78
34	15.22	2.84
35	14.56	2.89
36	13.93	2.95
37	13.04	3.00
38	12.77	3.05
39	12.23	3.10
40	11.71	3.15
41	11.22	3.20
42	10.76	3.25
43	10.31	3.30
44	9.89	3.35
45	9.46	3.39
46	9.10	3.44
47	8.74	3.48
48	8.39	3.52
49	8.05	3.57
50	7.73	3.51
51	7.43	3.65
52	7.14	3.68
53	6.86	3.72
54	6.60	3.76
55	6.34	3.80
56	6.10	3.83
57	5.87	3.37
58	5.65	3.90
59	5.44	3.93
60	5.24	3.96
61	5.04	3.99
62	4.86	4.02

63	4.68	4.05
64	4.51	4.08
65	4.35	4.11
66	4.13	4.13
67	4.04	4.16
68	3.90	4.18
69	3.76	4.21
70	3.63	4.23
71	3.50	4.25
72	3.38	4.28
73	3.26	4.30
74	3.15	4.32
75	3.04	4.34
76	2.94	4.36
77	2.84	4.38
78	2.74	4.40
79	2.65	4.42
80	2.56	4.43

Indoor pipe sensor&outdoor ambient sensor, defrosting sensor

Temperature(℃)	R(KO)	Power Input(V)
-20	90.79	0.90
-19	85.72	0.95
-18	80.96	0.99
-17	76.51	1.04
-16	72.33	1.08
-15	68.41	1.13
-14	64.73	1.18
-13	61.27	1.23
-12	58.02	1.28
-11	54.97	1.33
-10	52.10	1.39
-9	49.40	1.44
-8	46.88	1.50
-7	44.46	1.55
-6	42.21	1.61
-5	40.08	1.66
-4	38.08	1.72
-3	36.19	1.78
-2	34.41	1.84
-1	32.73	1.90
0	31.24	1.98

1	29.84	2.01
2	28.22	2.07
3	26.88	2.13
4	25.61	2.19
5	24.41	2.25
6	23.27	2.31
7	22.20	2.37
8	21.18	2.43
9	20.21	2.49
10	19.30	2.54
11	18.43	2.60
12	17.61	2.56
13	16.83	2.72
14	16.09	2.77
15	15.38	2.83
16	14.71	2.88
17	14.08	2.93
18	13.48	2.99
19	12.90	3.04
20	12.38	3.09
21	11.64	3.14
22	11.34	3.19
23	10.87	3.24
24	10.43	3.29
25	10.00	3.33
26	9.59	3.38
27	9.21	3.42
28	8.84	3.47
29	8.48	3.51
30	8.15	3.55
31	7.83	2.59
32	7.52	3.63
33	7.23	3.67
34	6.95	3.71
35	6.68	3.75
36	6.43	3.78
37	6.19	3.82
38	5.95	3.86
39	5.73	3.89
40	5.52	3.92
41	5.32	3.95
42	5.12	3.98
43	4.93	4.01
44	4.75	4.04

45	4.58	4.07
46	4.42	4.10
47	4.26	4.12
48	4.11	4.15
49	3.97	4.17
50	3.83	4.20
51	3.70	4.22
52	3.57	4.24
53	3.45	4.26
54	3.33	4.28
55	3.22	4.31
56	3.11	4.33
57	3.00	4.35
58	2.90	4.37
59	2.81	4.38
60	2.72	4.40
61	2.63	4.42
62	2.54	4.44
63	2.45	4.45
64	2.36	4.47
65	2.30	4.48
66	2.23	4.50
67	2.15	4.51
68	2.09	4.53
69	2.03	4.54
70	1.96	4.55
71	1.90	4.57
72	1.85	4.58
73	1.79	4.59
74	1.73	4.60
75	1.68	4.61
76	1.63	4.62
77	1.58	4.63
78	1.54	4.64
79	1.49	4.65
80	1.45	4.66

OUTDOOR discharge -temperature sensor

 $R_{80^{\circ}\text{C}}=50\text{K}\Omega\pm3\%$ $B_{25/80^{\circ}\text{C}}=4450\text{K}\pm3\%$

temperature	max Resistance	normal, Resistance	min Resistance	δ (t)	
(°C)	(K Ω)	(K Ω)	(K Ω)	(°C)	
-30	14646.0505	12061.7438	9924.4999	-2.96	2.45
-29	13654.1707	11267.8730	9290.2526	-2.95	2.44
-28	12735.8378	10531.3695	8700.6388	-2.93	2.44
-27	11885.1336	9847.7240	8152.2338	-2.92	2.43
-26	11096.6531	9212.8101	7641.8972	-2.91	2.42
-25	10365.4565	8622.8491	7166.7474	-2.90	2.42
-24	9687.0270	8074.3787	6724.1389	-2.88	2.41
-23	9057.2314	7564.2244	6311.6413	-2.87	2.41
-22	8472.2852	7089.4741	5927.0206	-2.86	2.40
-21	7928.7217	6647.4547	5568.2222	-2.84	2.39
-20	7423.3626	6235.7109	5233.3554	-2.83	2.39
-19	6953.2930	5851.9864	4920.6791	-2.82	2.38
-18	6515.8375	5494.2064	4628.5894	-2.80	2.37
-17	6108.5393	5160.4621	4355.6078	-2.79	2.37
-16	5729.1413	4848.9963	4100.3708	-2.77	2.36
-15	5375.5683	4558.1906	3861.6201	-2.76	2.35
-14	5045.9114	4286.5535	3638.1938	-2.75	2.34
-13	4738.4141	4032.7098	3429.0191	-2.73	2.34
-12	4451.4586	3795.3910	3233.1039	-2.72	2.33
-11	4183.5548	3573.4260	3049.5312	-2.70	2.32
-10	3933.3289	3365.7336	2877.4527	-2.69	2.31
-9	3699.5139	3171.3148	2716.0828	-2.67	2.30
-8	3480.9407	2989.2460	2564.6945	-2.66	2.29
-7	3276.5302	2818.6731	2422.6139	-2.64	2.28
-6	3085.2854	2658.8058	2289.2164	-2.63	2.28
-5	2906.2851	2508.9126	2163.9230	-2.61	2.27
-4	2738.6777	2368.3158	2046.1961	-2.60	2.26
-3	2581.6752	2236.3876	1935.5371	-2.58	2.25
-2	2434.5487	2112.5459	1831.4826	-2.56	2.24
-1	2296.6230	1996.2509	1733.6024	-2.55	2.23
0	2167.2730	1887.0018	1641.4966	-2.53	2.22

1	2045.9191	1784.3336	1554.7931	-2.52	2.21
2	1932.0242	1687.8144	1473.1460	-2.50	2.20
3	1825.0899	1597.0431	1396.2333	-2.48	2.19
4	1724.6540	1511.6468	1323.7551	-2.47	2.17
5	1630.2870	1431.2787	1255.4324	-2.45	2.16
6	1541.5904	1355.6163	1191.0048	-2.43	2.15
7	1458.1938	1284.3593	1130.2298	-2.41	2.14
8	1379.7528	1217.2282	1072.8813	-2.40	2.13
9	1305.9472	1153.9626	1018.7481	-2.38	2.12
10	1236.4792	1094.3200	967.6334	-2.36	2.11
11	1171.0715	1038.0743	919.3533	-2.35	2.09
12	1109.4661	985.0146	873.7359	-2.33	2.08
13	1051.4226	934.9440	830.6210	-2.31	2.07
14	996.7169	887.6792	789.8583	-2.29	2.06
15	945.1404	843.0486	751.3077	-2.27	2.04
16	896.4981	800.8922	714.8380	-2.26	2.03
17	850.6086	761.0603	680.3265	-2.24	2.02
18	807.3024	723.4134	647.6580	-2.22	2.00
19	766.4212	687.8205	616.7252	-2.20	1.99
20	727.8172	654.1596	587.4271	-2.18	1.98
21	691.3524	622.3161	559.6694	-2.16	1.96
22	656.8979	592.1831	533.3634	-2.14	1.95
23	624.3328	563.6604	508.4261	-2.12	1.93
24	593.5446	536.6540	484.7796	-2.10	1.92
25	564.4275	511.0760	462.3510	-2.09	1.90
26	536.9865	486.9352	441.1516	-2.07	1.89
27	511.0105	464.0500	421.0258	-2.05	1.87
28	486.4151	442.3499	401.9146	-2.03	1.86
29	463.1208	421.7683	383.7626	-2.01	1.84
30	441.0535	402.2430	366.5175	-1.99	1.83
31	420.1431	383.7151	350.1301	-1.97	1.81
32	400.3242	366.1295	334.5542	-1.95	1.80
33	381.5350	349.4341	319.7460	-1.93	1.78
34	363.7176	333.5801	305.6645	-1.90	1.76
35	346.8176	318.5216	292.2709	-1.88	1.75
36	330.7839	304.2151	279.5286	-1.86	1.73
37	315.5682	290.6199	267.4031	-1.84	1.71
38	301.1254	277.6976	255.8620	-1.82	1.70
39	287.4128	265.4119	244.8745	-1.80	1.68
40	274.3905	253.7288	234.4118	-1.78	1.66

41	262.0206	242.6161	224.4465	-1.76	1.64
42	250.2676	232.0436	214.9529	-1.74	1.63
43	239.0983	221.9825	205.9065	-1.71	1.61
44	228.4809	212.4060	197.2844	-1.69	1.59
45	218.3860	203.2887	189.0648	-1.67	1.57
46	208.7855	194.6066	181.2273	-1.65	1.55
47	199.6531	186.3369	173.7524	-1.63	1.54
48	190.9639	178.4584	166.6217	-1.60	1.52
49	182.6945	170.9508	159.8181	-1.58	1.50
50	174.8228	163.7951	153.3249	-1.56	1.48
51	167.3280	156.9733	147.1268	-1.53	1.46
52	160.1904	150.4683	141.2090	-1.51	1.44
53	153.3914	144.2641	135.5577	-1.49	1.42
54	146.9136	138.3454	130.1598	-1.47	1.40
55	140.7403	132.6980	125.0027	-1.44	1.38
56	134.8559	127.3081	120.0746	-1.42	1.36
57	129.2457	122.1630	115.3645	-1.40	1.34
58	123.8956	117.2504	110.8618	-1.37	1.32
59	118.7926	112.5589	106.5564	-1.35	1.30
60	113.9241	108.0776	102.4388	-1.32	1.28
61	109.2784	103.7961	98.5000	-1.30	1.26
62	104.8443	99.7046	94.7315	-1.28	1.23
63	100.6112	95.7939	91.1253	-1.25	1.21
64	96.5692	92.0553	87.6735	-1.23	1.19
65	92.7088	88.4805	84.3690	-1.20	1.17
66	89.0211	85.0614	81.2048	-1.18	1.15
67	85.4976	81.7908	78.1744	-1.15	1.12
68	82.1303	78.6615	75.2715	-1.13	1.10
69	78.9116	75.6668	72.4902	-1.10	1.08
70	75.8343	72.8004	69.8249	-1.08	1.06
71	72.8916	70.0561	67.2703	-1.05	1.03
72	70.0770	67.4283	64.8213	-1.03	1.01
73	67.3844	64.9115	62.4731	-1.00	0.99
74	64.8080	62.5006	60.2211	-0.98	0.96
75	62.3423	60.1906	58.0609	-0.95	0.94
76	59.9821	57.9770	55.9885	-0.92	0.92
77	57.7223	55.8552	53.9998	-0.90	0.89
78	55.5583	53.8210	52.0912	-0.87	0.87
79	53.4856	51.8706	50.2591	-0.85	0.84
80	51.5000	50.0000	48.5000	-0.85	0.84

81	49.7063	48.2057	46.7083	-0.85	0.85
82	47.9835	46.4842	44.9911	-0.89	0.89
83	46.3286	44.8323	43.3452	-0.93	0.92
84	44.7385	43.2468	41.7672	-0.96	0.95
85	43.2105	41.7248	40.2540	-1.00	0.99
86	41.7386	40.2604	38.7996	-1.03	1.02
87	40.3241	38.8545	37.4048	-1.07	1.06
88	38.9643	37.5045	36.0668	-1.11	1.09
89	37.6569	36.2078	34.7831	-1.14	1.13
90	36.3996	34.9622	33.5513	-1.18	1.16
91	35.1903	33.7653	32.3689	-1.22	1.19
92	34.0269	32.6151	31.2338	-1.26	1.23
93	32.9075	31.5096	30.1438	-1.30	1.27
94	31.8302	30.4467	29.0970	-1.33	1.30
95	30.7933	29.4246	28.0915	-1.37	1.34
96	29.7950	28.4417	27.1254	-1.41	1.37
97	28.8337	27.4961	26.1970	-1.45	1.41
98	27.9078	26.5864	25.3048	-1.49	1.44
99	27.0160	25.7110	24.4470	-1.53	1.48
100	26.1569	24.8685	23.6222	-1.57	1.52
101	25.3290	24.0574	22.8291	-1.61	1.55
102	24.5311	23.2765	22.0662	-1.65	1.59
103	23.7620	22.5245	21.3323	-1.69	1.63
104	23.0205	21.8002	20.6261	-1.73	1.66
105	22.3055	21.1025	19.9465	-1.77	1.70
106	21.6159	20.4303	19.2924	-1.81	1.74
107	20.9508	19.7825	18.6626	-1.85	1.77
108	20.3091	19.1582	18.0563	-1.89	1.81
109	19.6899	18.5564	17.4723	-1.93	1.85
110	19.0924	17.9761	16.9098	-1.98	1.89
111	18.5157	17.4166	16.3680	-2.02	1.93
112	17.9590	16.8769	15.8458	-2.06	1.96
113	17.4214	16.3564	15.3427	-2.10	2.00
114	16.9023	15.8542	14.8577	-2.15	2.04
115	16.4010	15.3696	14.3902	-2.19	2.08
116	15.9167	14.9020	13.9394	-2.23	2.12
117	15.4489	14.4506	13.5047	-2.27	2.16
118	14.9968	14.0149	13.0855	-2.32	2.19
119	14.5599	13.5942	12.6811	-2.36	2.23

120	14.1376	13.1879	12.2909	-2.41	2.27
121	13.7294	12.7955	11.9144	-2.45	2.31
122	13.3347	12.4165	11.5510	-2.50	2.35
123	12.9531	12.0503	11.2003	-2.54	2.39
124	12.5840	11.6965	10.8617	-2.58	2.43
125	12.2270	11.3545	10.5348	-2.63	2.47
126	11.8817	11.0240	10.2191	-2.68	2.51
127	11.5475	10.7046	9.9142	-2.72	2.55
128	11.2242	10.3957	9.6197	-2.77	2.59
129	10.9112	10.0970	9.3352	-2.81	2.63
130	10.6084	9.8082	9.0602	-2.86	2.67
131	10.3151	9.5288	8.7945	-2.91	2.71
132	10.0312	9.2586	8.5378	-2.95	2.75
133	9.7563	8.9971	8.2895	-3.00	2.80
134	9.4901	8.7441	8.0495	-3.05	2.84
135	9.2322	8.4993	7.8175	-3.09	2.88
136	8.9824	8.2623	7.5931	-3.14	2.92
137	8.7404	8.0329	7.3760	-3.19	2.96
138	8.5059	7.8108	7.1660	-3.24	3.00
139	8.2787	7.5958	6.9629	-3.29	3.04
140	8.0584	7.3875	6.7664	-3.33	3.09

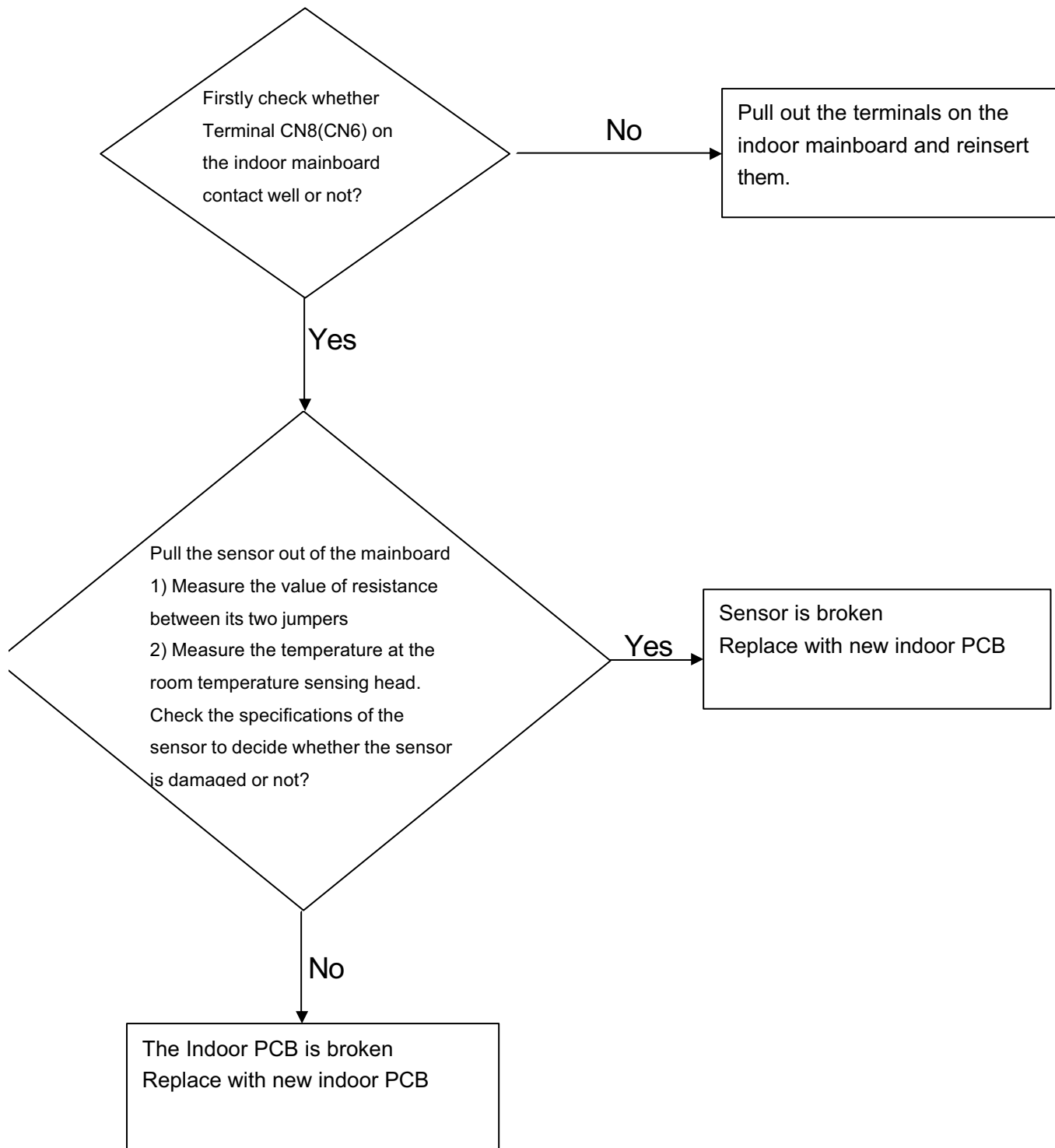
5. Trouble shooting

Indoor	Outdoor	Possible Reasons
E1	/	1)Room-temperature sensor 2) Indoor PCB
E2	/	1)Heat-exchange sensor 2)Indoor PCB
F21	With the malfunction, LED1 on the outdoor mainboard blinks 10 times at frequency of 1 Hz	1) Defrosting temperature sensor 2) Outdoor PCB
F25	With the malfunction, LED1 on the outdoor mainboard blinks 13 times at frequency of 1 Hz	1) Exhaust temperature sensor 2) Outdoor PCB
F6	With the malfunction, LED1 on the outdoor mainboard blinks once at 12 times of 1 Hz and interval of 2 seconds or so.	1) Ambient temperature sensor 2) Outdoor PCB
E7	With the malfunction, LED1 on the outdoor mainboard blinks 15 times	1)The outdoor mainboard needs dehumidification 2)The outdoor mainboard needs dehumidification 3)The linking cable between the indoor and outdoor units is not well connected or the core wires are not well insulated 4)The indoor PCB might be broken 5)The outdoor PCB might be broken 6)The SPDU might be broken
F11	With the malfunction, LED1 on the outdoor mainboard blinks 17 or 18 times at frequency of 1 Hz	1) The wiring of compressor is incorrect or the connection is poor 2)The SPDU might be broken 3) Compressor might be damaged.
F4	With the malfunction, LED1 on the outdoor mainboard blinks 8 times at frequency of 1 Hz	1) The cryogen may have been leaked during installation, or there may be leakage in the piping system. 2)Exhaust temperature sensor is broken 3) The outdoor mainboard is damaged and needs be replaced

F22	With this malfunction, LED1 on the outdoor mainboard blinks 3 times.	1)The SPDU is broken 2)The power supply is not good 3) The system may have been over or under charged with gas
F1	With the malfunction, LED1 on the outdoor mainboard blinks 2 times at frequency of 1 Hz	1)IPM Module might be poorly radiated 2)IPM Module might be broken 3)Compressor might be broken
E9	With the malfunction, LED1 on the outdoor mainboard blinks 21 times at frequency of 1 Hz	1)Check whether the indoor unit blows poorly due to blocked filters or poor condition of the fan 2)The system is over charged with gas 3)Temperature of coil pipes on the indoor unit too high
E4,F12	With outdoor EEPROM, LED1 on the outdoor mainboard blinks once at frequency of 1 Hz	1)E4 the indoor PCB might be damaged 2)F12 the outdoor PCB might be damaged
E14	/	1) Whether Terminal CN2 on the indoor mainboard is well inserted or not? 2) The indoor mainboard is damaged 3) The motor of the indoor unit is damaged
F8	With the malfunction, LED1 on the outdoor mainboard blinks 9 times at frequency of 1 Hz	1)The installation on terminal CN2 might be not good 2)The mainboard of the indoor unit is damaged 3)The motor of the Outdoor unit is damaged
F3	With the malfunction, LED1 on the outdoor mainboard blinks 4 times at frequency of 1 Hz	1)The connection between IPM and the outdoor PCB might be not good 2)The mainboard of the outdoor unit is damaged 3)The IPM module is damaged
F19	With the malfunction, LED1 on the outdoor mainboard blinks 6 times at frequency of 1 Hz	1)The IPM module is damaged 2)Check power supply 3)The reactor of outdoor is damage 4)The rectifying bridge or IPM module is damage

E1: Room temperature sensor failure CN8

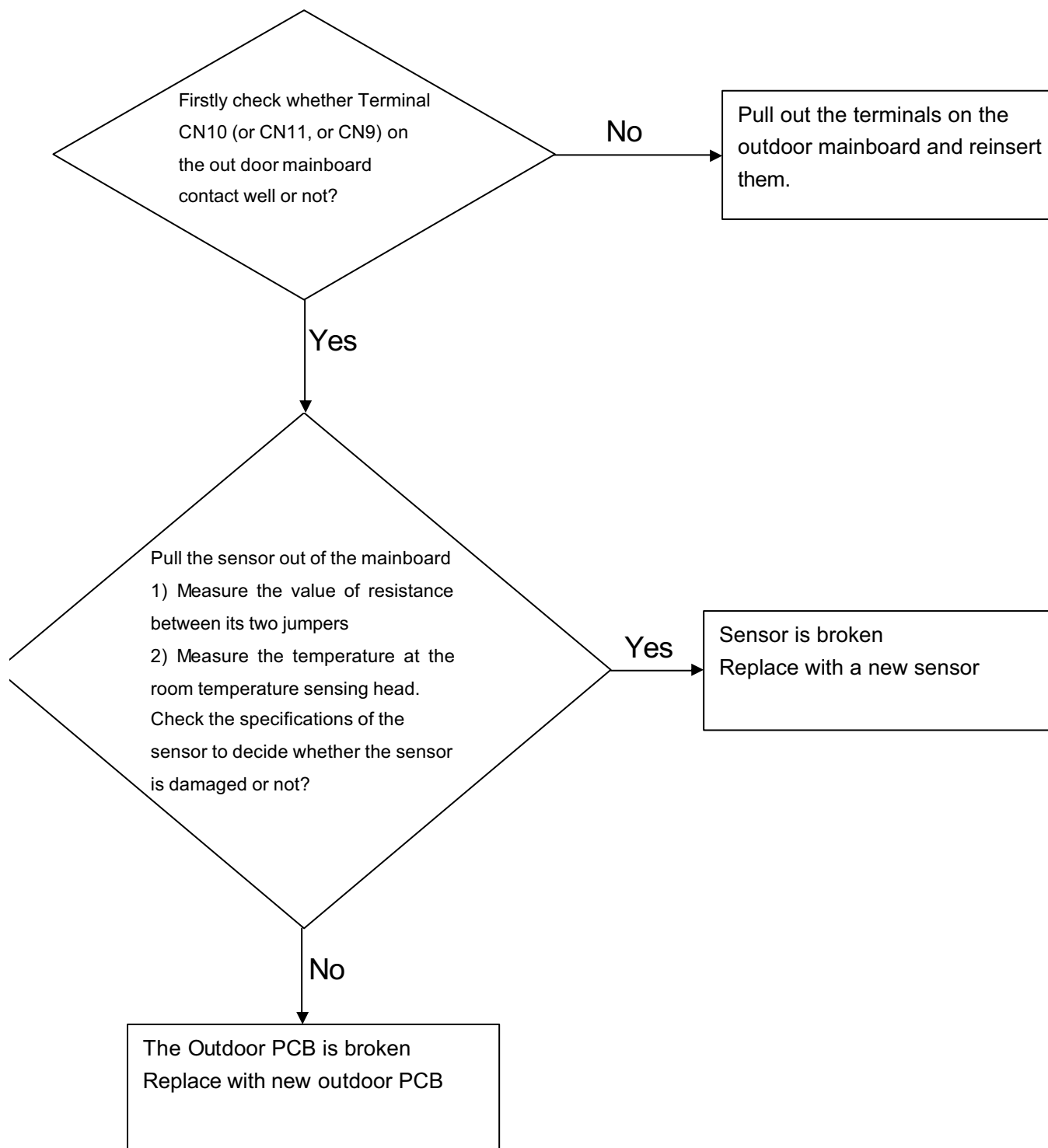
E2: Heat-exchange sensor failure



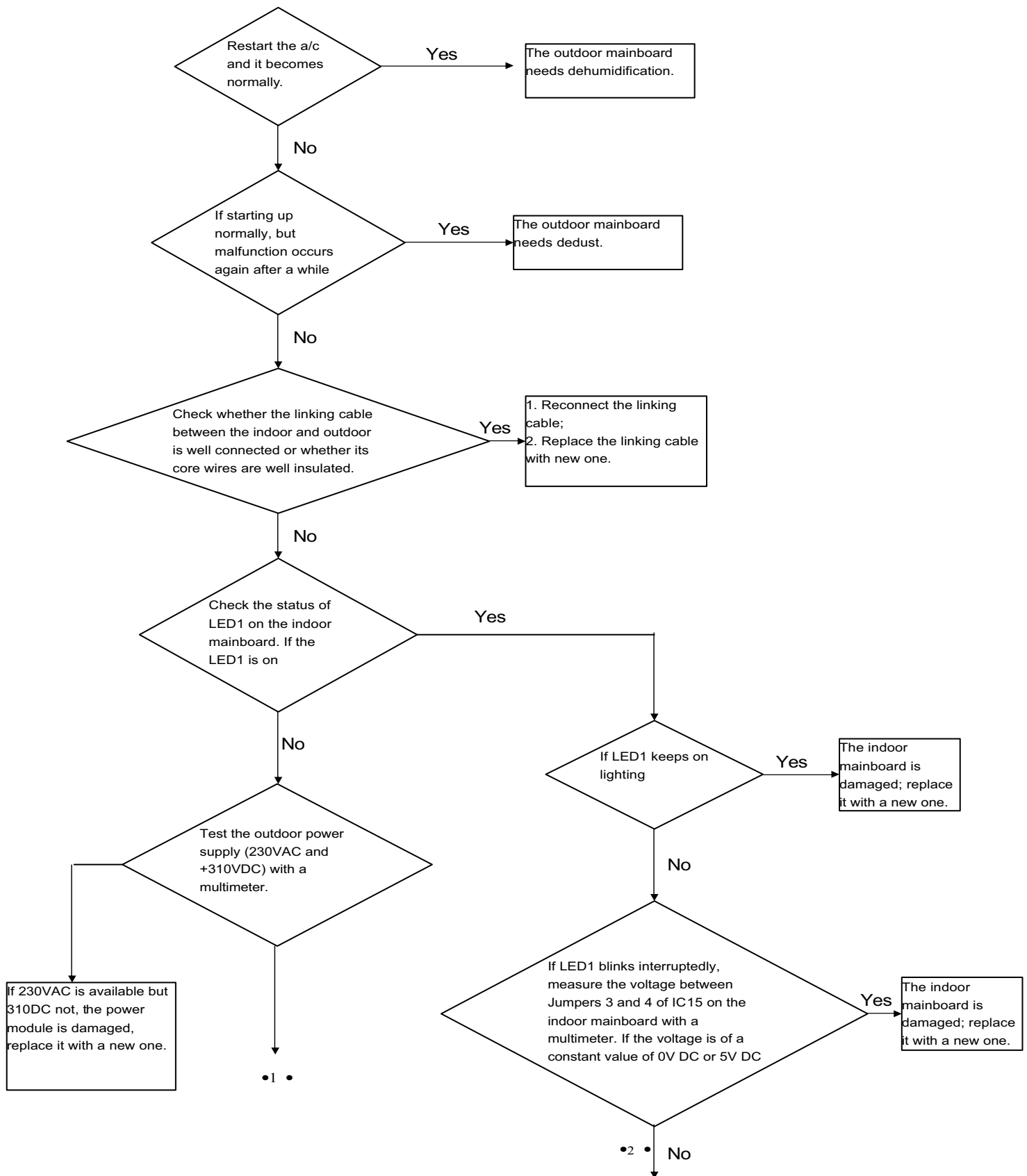
F21: Frost-removing temperature sensor failure CN10

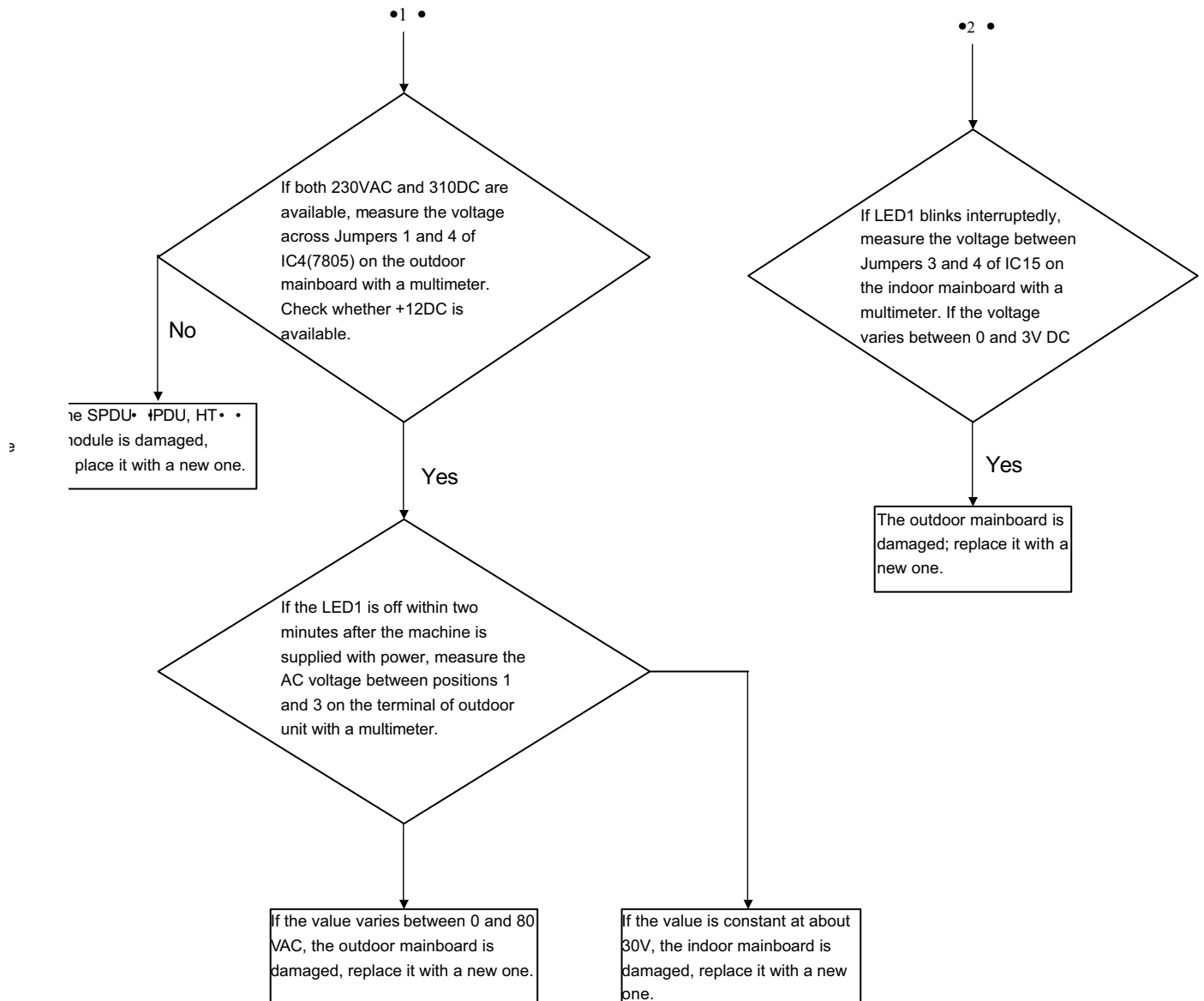
F25: Exhaust temperature sensor failure CN11

F6: Ambient temperature sensor failure CN9

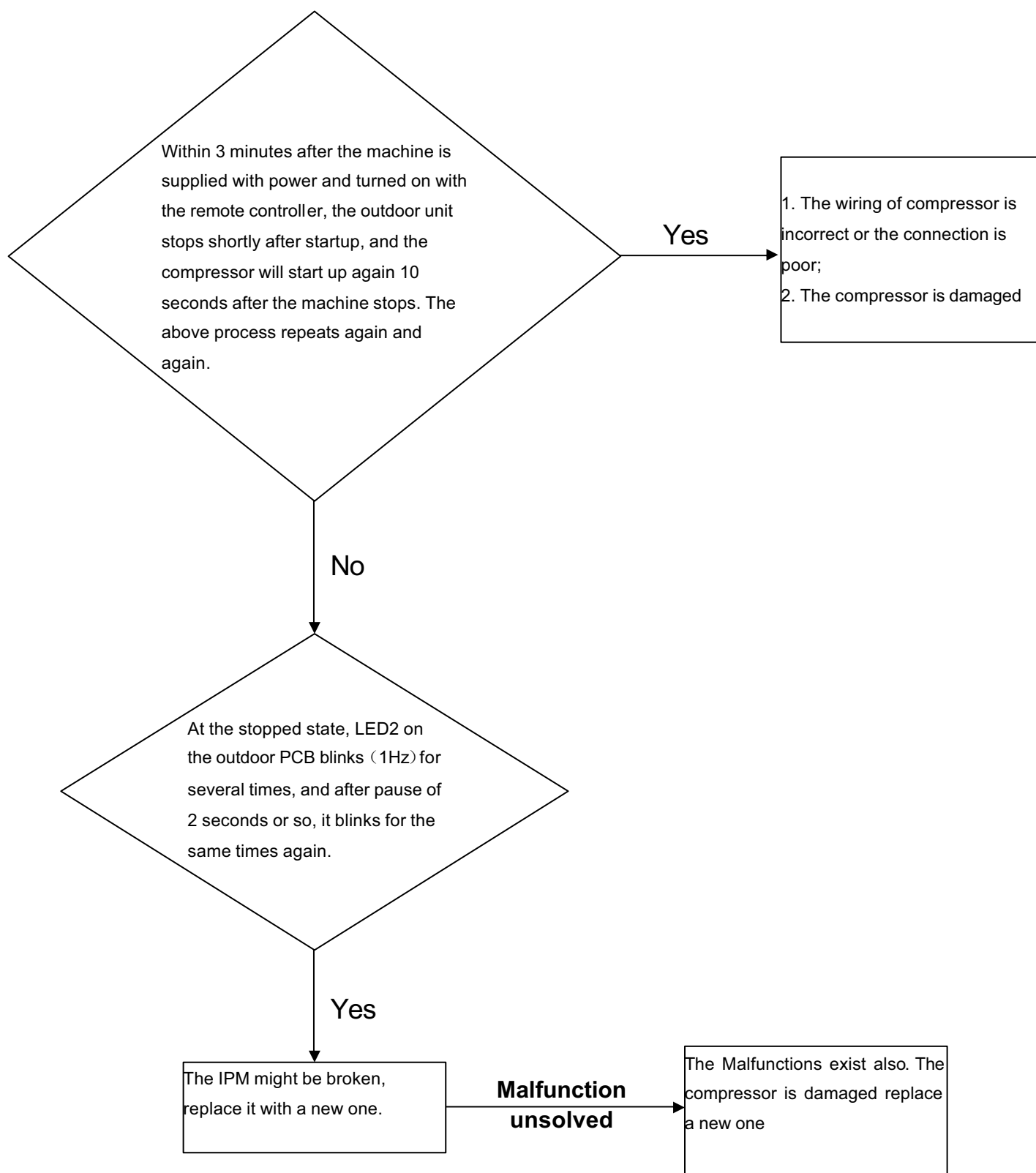


E7: Communication fault between the indoor and outdoor units

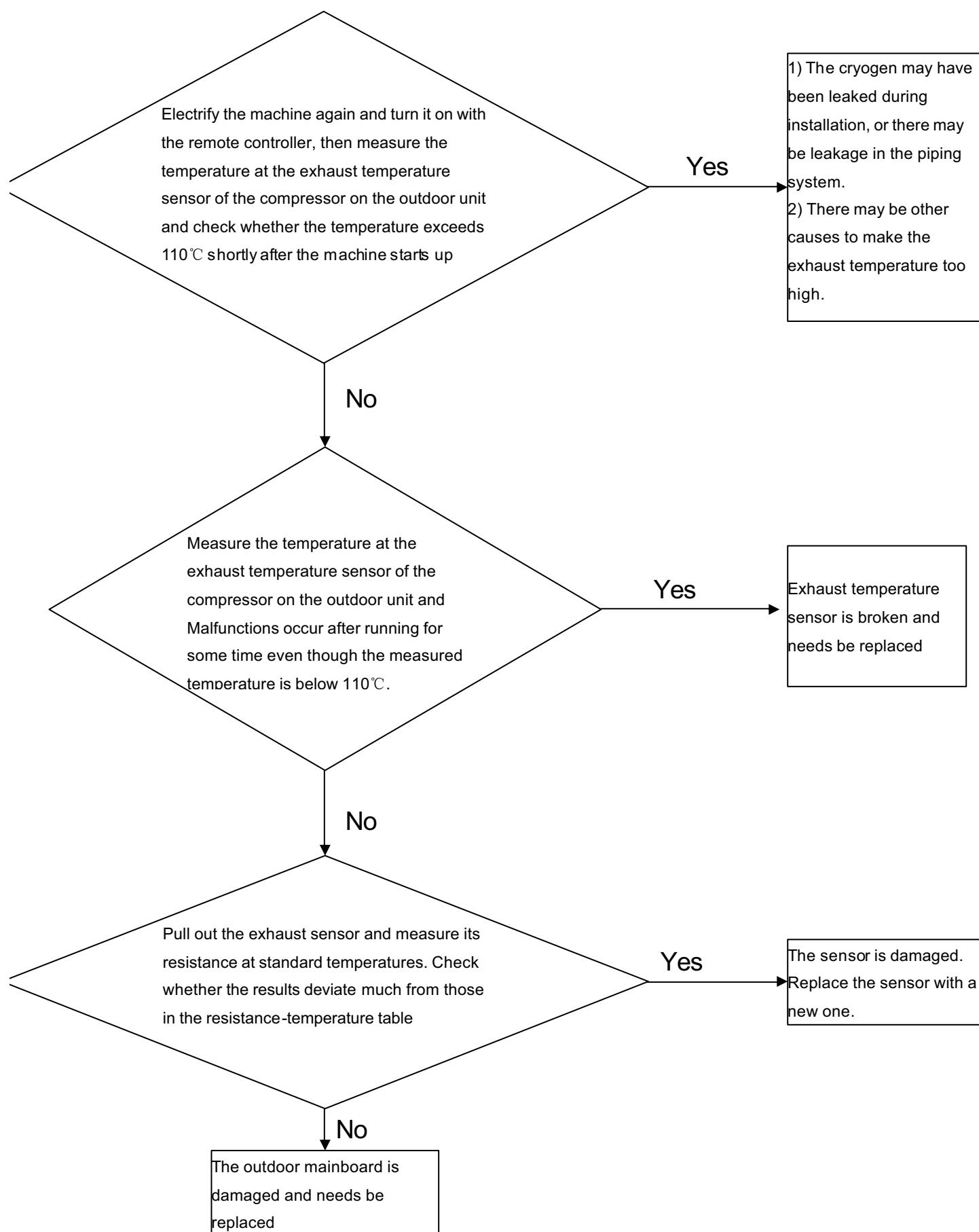




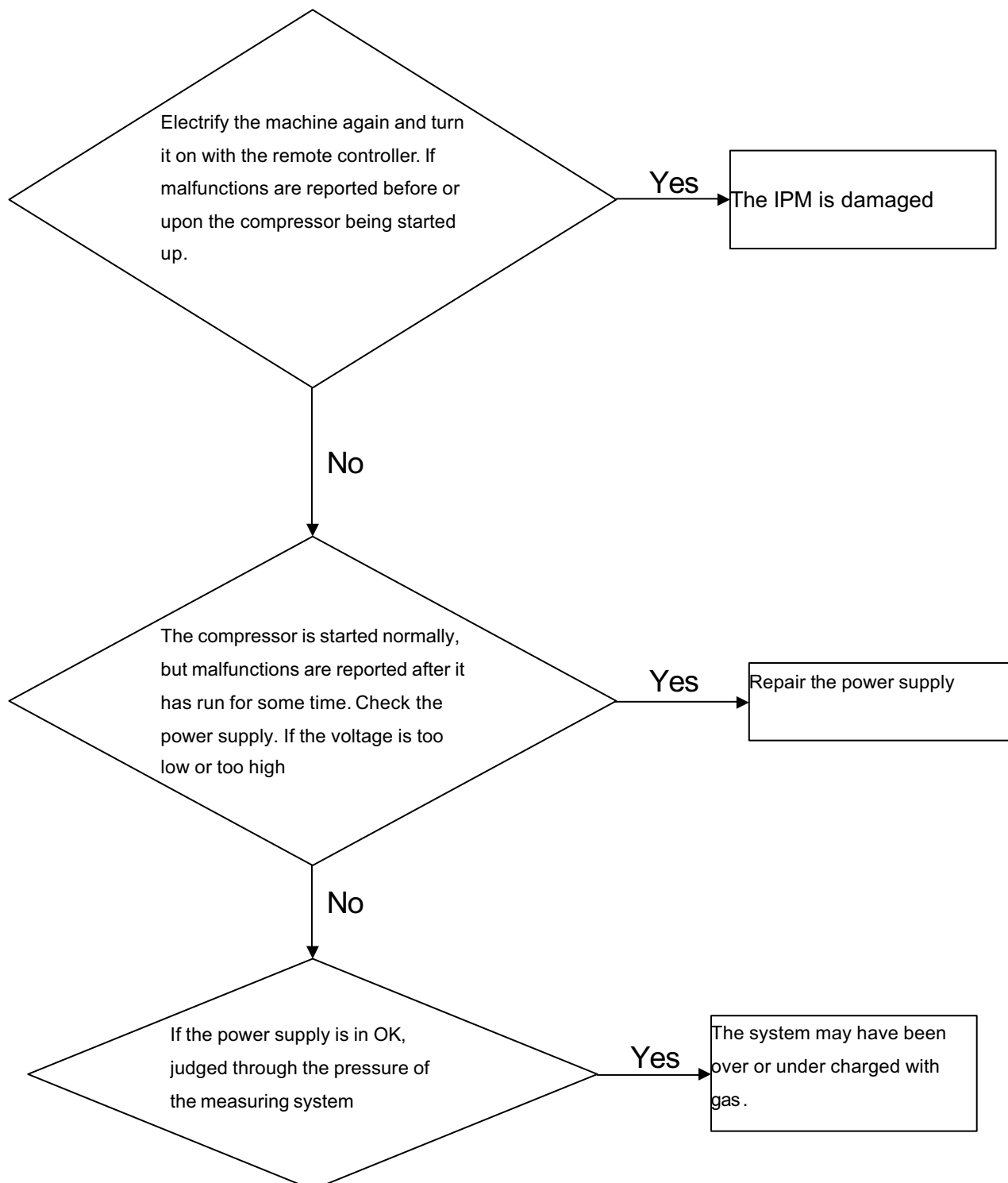
F11: The malfunction of the compressor' rotor circuit



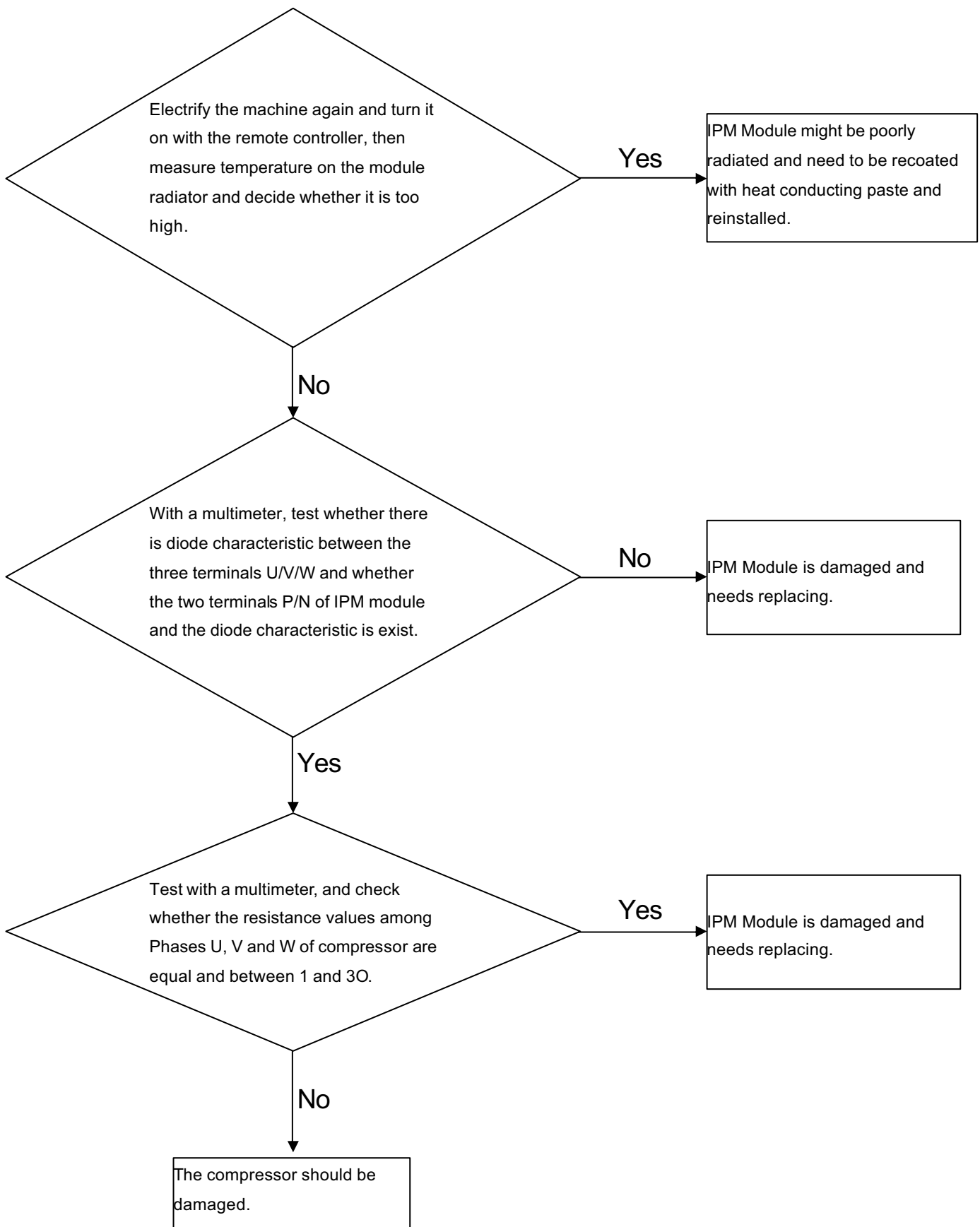
F4: Overheat protection for exhaust temperature



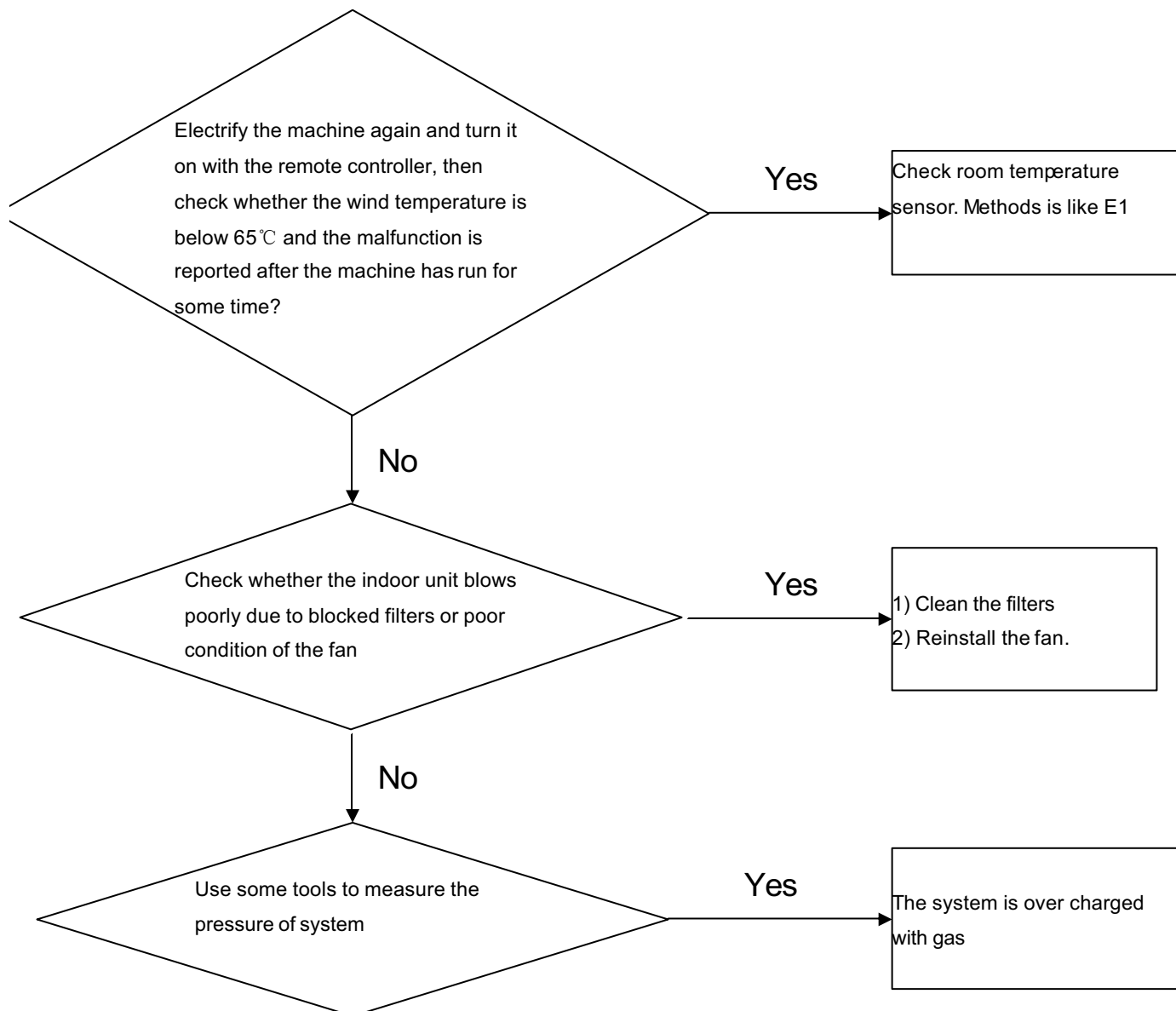
F22: AC electricity protection



F1: The protection of IPM



E9: High work-intense protection



E4: Indoor EEPROM error

Replace the PCB of indoor unit

F12: Outdoor EEPROM error

Replace the PCB of outdoor unit

7.3.2 Indoor fan motor malfunction

Indoor Display **E14**

Method of Malfunction Detection

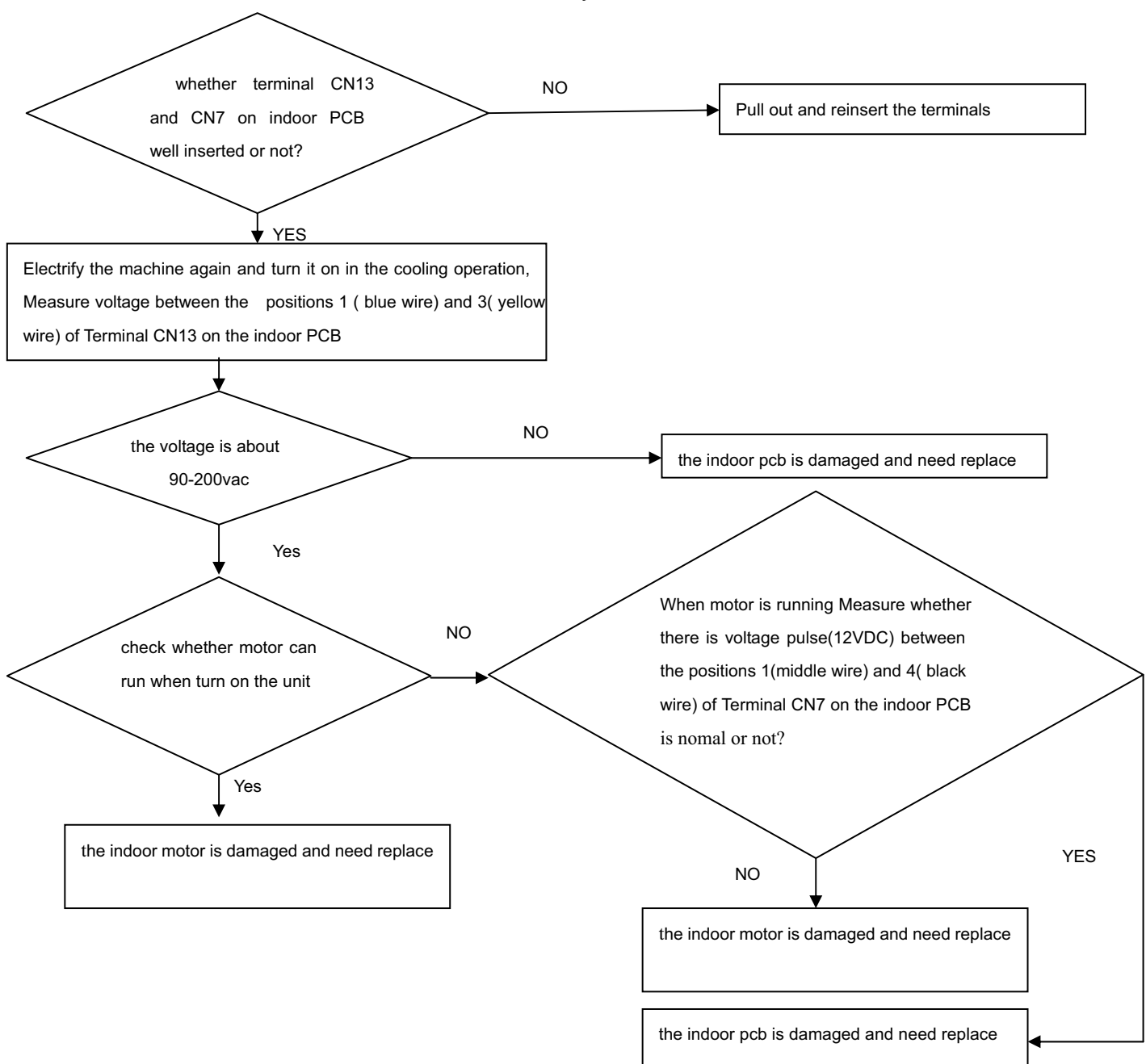
The rotation speed detected by the Hall IC during fan motor operation is used to determine abnormal fan motor operation

Malfunction Decision Conditions

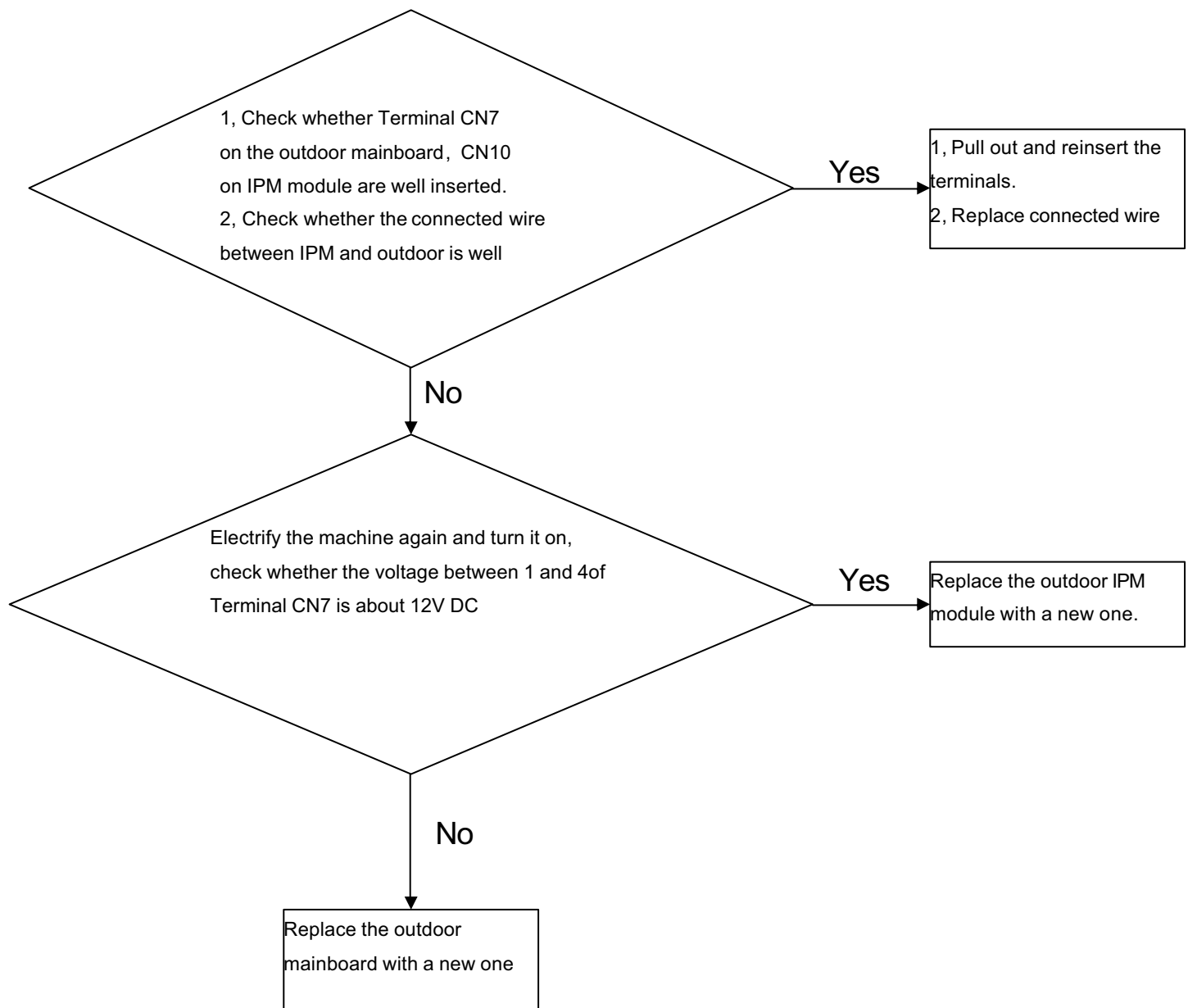
when the detected rotation feedback signal isn't received in 2 minutes

Supposed Causes

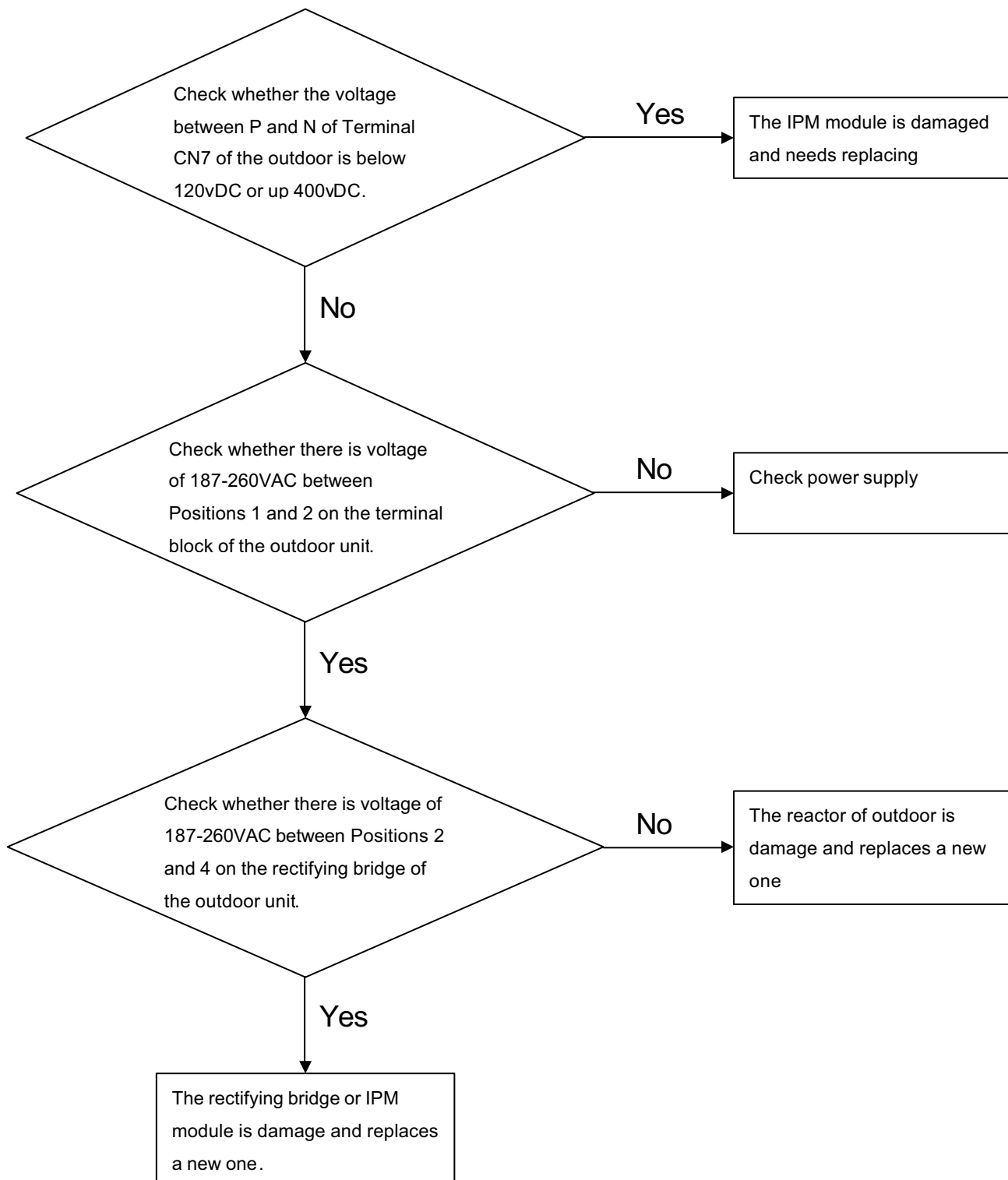
- Operation halt due to breaking of wire inside the fan motor .
- Operation halt due to breaking of the fan motor lead wires
- Detection error due to faulty indoor unit PCB



F3: Communication fault between the IPM and outdoor PCB

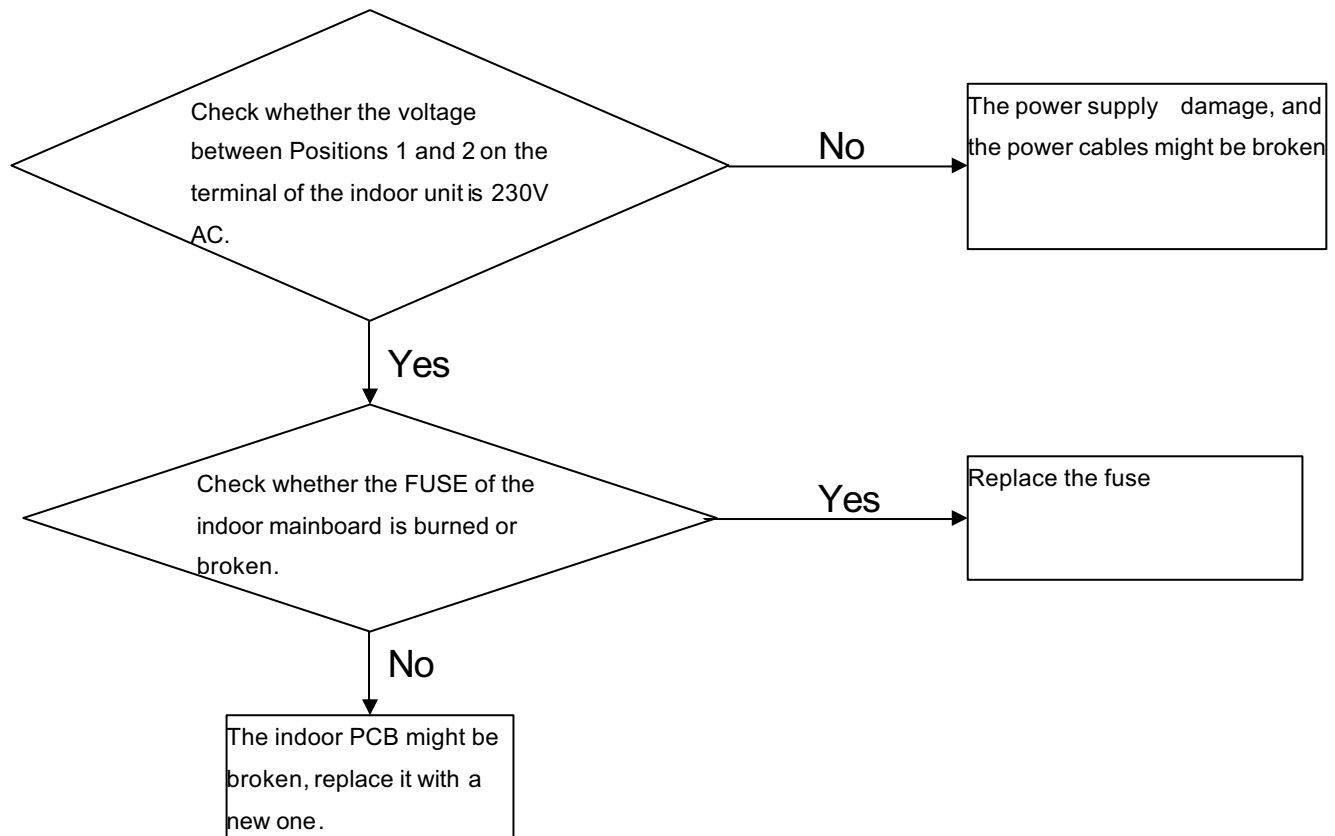


F19: Power voltage is too high or low



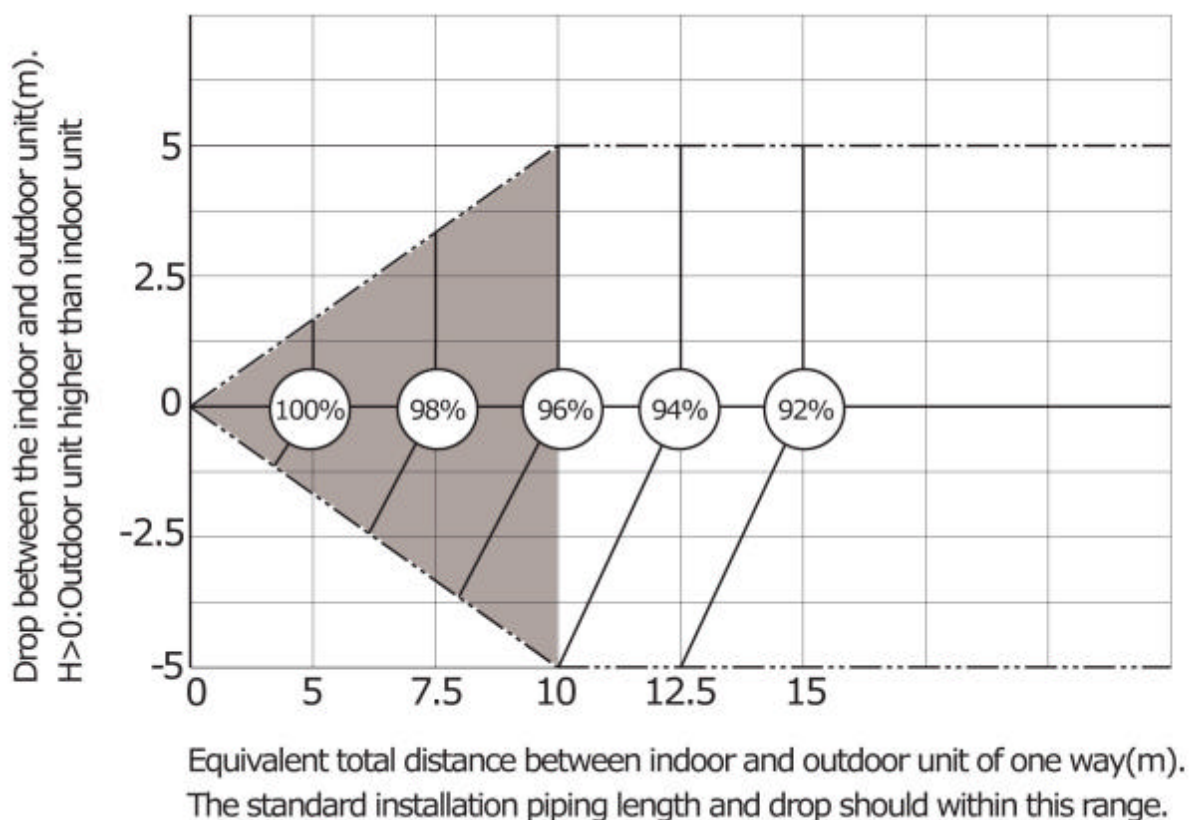
Other malfunctions: With the machine electrified, the unit cannot open

If there is no response after the emergency button is pressed down, shoot the trouble as follows



6. Performance curves diagram

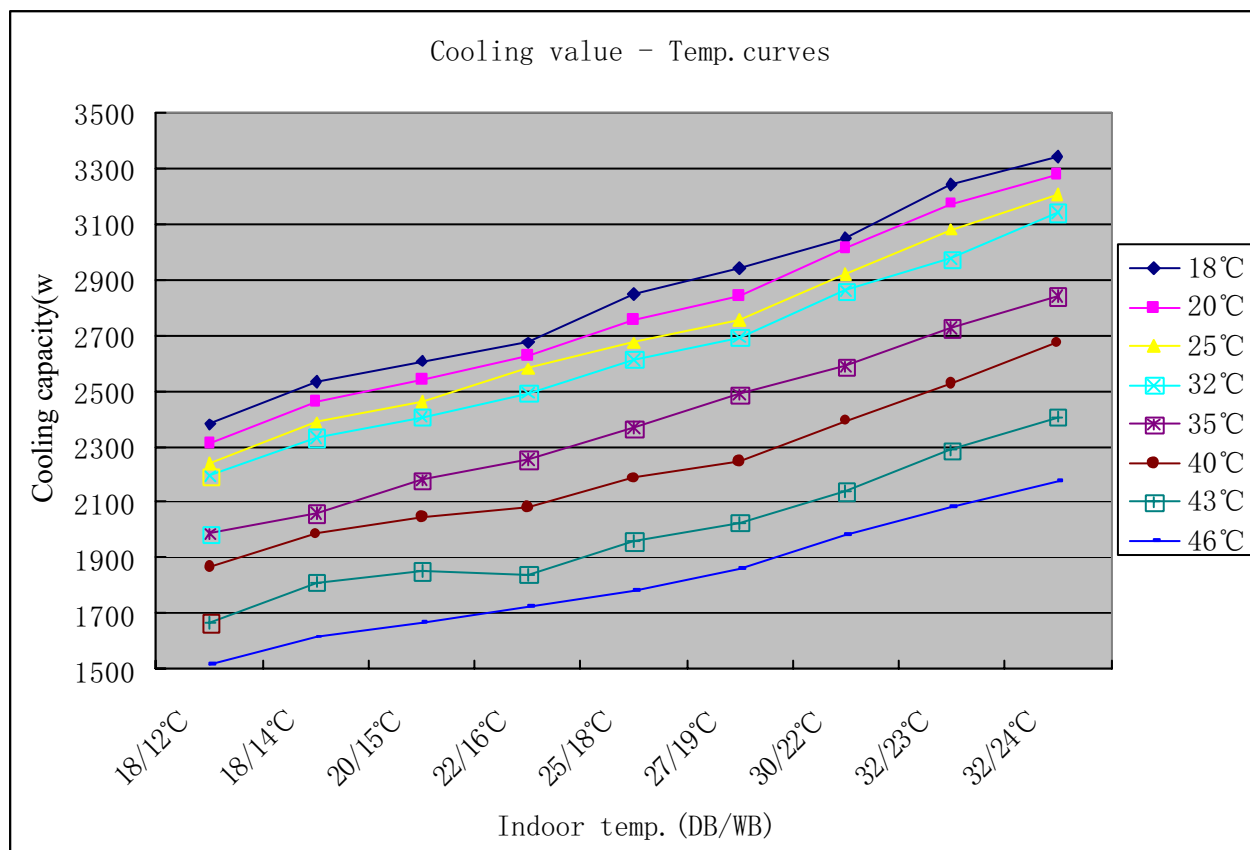
6.1 High drop and long pipe capacity modification curves



6.2.1 Cooling capacity-temperature curves

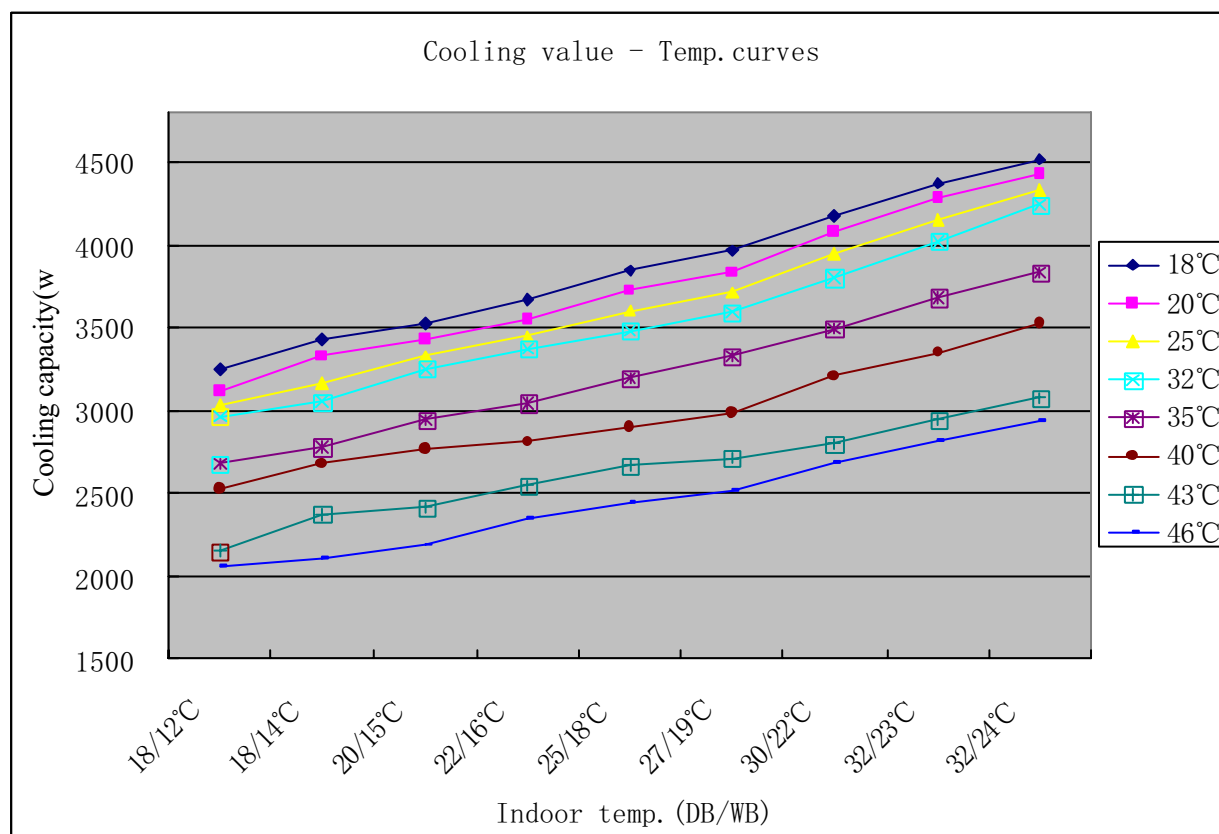
HSU-09HSA03/R2(DB)

Cooling value - Temperature table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18℃	20℃	25℃	32℃	35℃	40℃	43℃	46℃
18/12℃	2383	2313	2243	2196	1986	1866	1669	1518
18/14℃	2534	2460	2386	2336	2060	1986	1811	1615
20/15℃	2610	2537	2460	2409	2179	2048	1854	1666
22/16℃	2672	2625	2580	2493	2254	2082	1838	1729
25/18℃	2849	2754	2671	2615	2365	2187	1963	1780
27/19℃	2940	2842	2750	2693	2486	2247	2029	1862
30/22℃	3045	3015	2923	2862	2588	2394	2140	1979
32/23℃	3240	3173	3077	2971	2724	2527	2285	2083
32/24℃	3342	3277	3208	3141	2841	2670	2405	2172



HSU-12HSA03/R2(DB)

Cooling value - Temperature table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18°C	20°C	25°C	32°C	35°C	40°C	43°C	46°C
18/12°C	3244	3122	3027	2964	2681	2520	2144	2050
18/14°C	3421	3321	3163	3056	2781	2680	2372	2100
20/15°C	3524	3425	3322	3252	2941	2765	2417	2183
22/16°C	3667	3544	3442	3365	3043	2811	2543	2345
25/18°C	3846	3718	3605	3478	3192	2900	2669	2444
27/19°C	3969	3837	3713	3586	3325	2990	2714	2514
30/22°C	4171	4070	3946	3800	3494	3200	2795	2672
32/23°C	4374	4283	4154	4018	3678	3343	2942	2812
32/24°C	4512	4422	4331	4241	3835	3523	3068	2933



6.2.2 Heating capacity-temperature curves

HSU-09HSA03/R2(DB)

Heating capacity - Temp. curves				
Outdoor temp.	Indoor temp. (Humidity 46%)			
DB/WB	20/15°C	20/12°C	20/14.5°C	27/18°C
-5°C	2336	2313	2341	2280
0°C	2534	2488	2437	2397
5°C	2610	2600	2575	2564
7/6°C	2742	2697	2661	2605
10°C	2849	2880	2905	2819
15°C	3037	3007	2992	2946
24°C	3345	3297	3246	3276

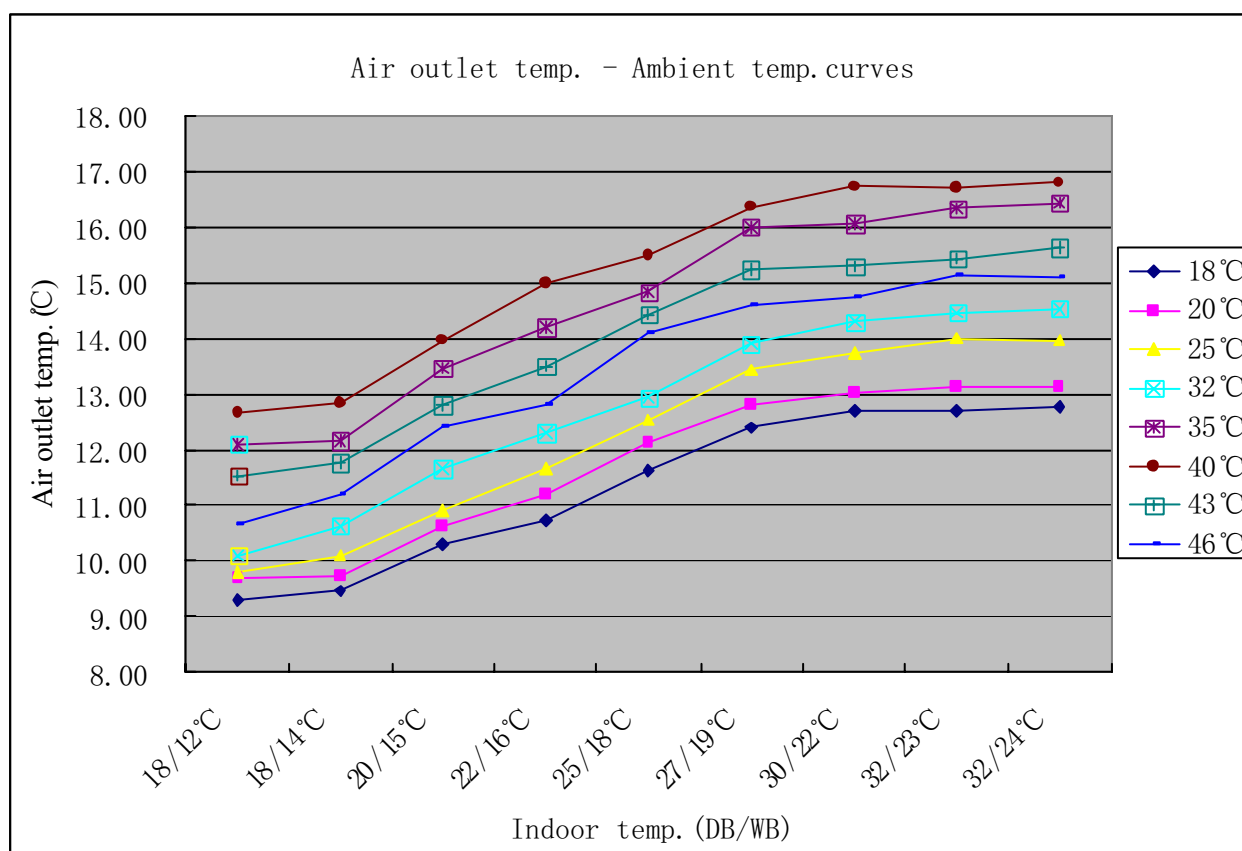
HSU-12HSA03/R2(DB)

Heating capacity - Temp. curves				
Outdoor temp.	Indoor temp. (Humidity 46%)			
DB/WB	20/15°C	20/12°C	20/14.5°C	27/18°C
-5°C	2536	2513	2541	2480
0°C	2734	2688	2637	2597
5°C	2810	2800	2775	2764
7/6°C	2942	2897	2861	2805
10°C	3049	3080	3105	3019
15°C	3237	3207	3192	3146
24°C	3545	3497	3446	3476

6.3 Air outlet temp.-ambient temperature curves

HSU-09HSA03/R2(DB)

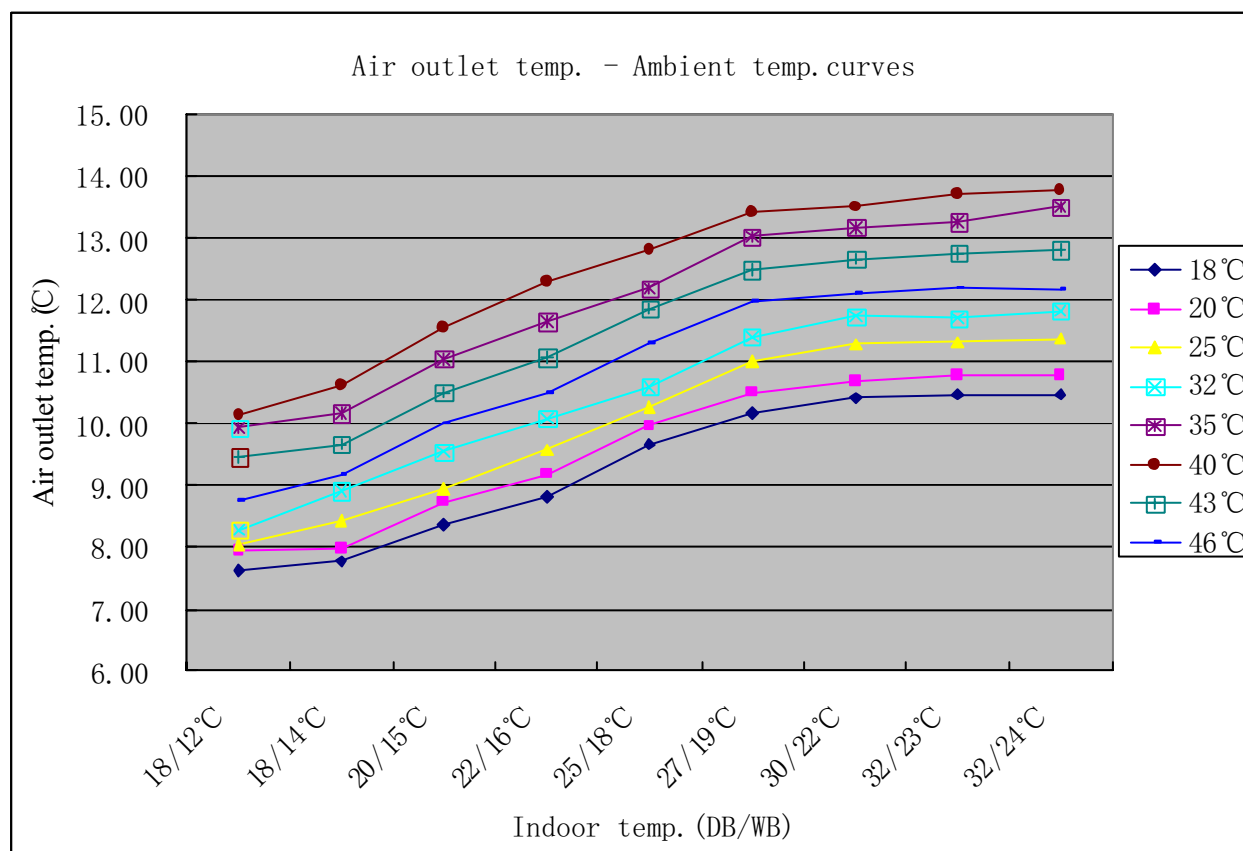
Air outlet temp. - Ambient temp. table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18℃	20℃	25℃	32℃	35℃	40℃	43℃	46℃
18/12℃	9.30	9.69	9.81	10.10	12.10	12.66	11.52	10.67
18/14℃	9.47	9.74	10.10	10.64	12.16	12.85	11.77	11.19
20/15℃	10.29	10.64	10.91	11.65	13.46	13.97	12.82	12.39
22/16℃	10.74	11.20	11.68	12.31	14.19	15.00	13.51	12.80
25/18℃	11.63	12.14	12.52	12.93	14.85	15.50	14.44	14.10
27/19℃	12.41	12.80	13.42	13.89	15.99	16.37	15.23	14.60
30/22℃	12.69	13.04	13.75	14.29	16.08	16.72	15.31	14.75
32/23℃	12.69	13.15	14.00	14.46	16.32	16.71	15.44	15.12
32/24℃	12.76	13.15	13.97	14.54	16.42	16.81	15.64	15.11



HSU-12HSA03/R2(DB)

Air outlet temp. - Ambient temp. table

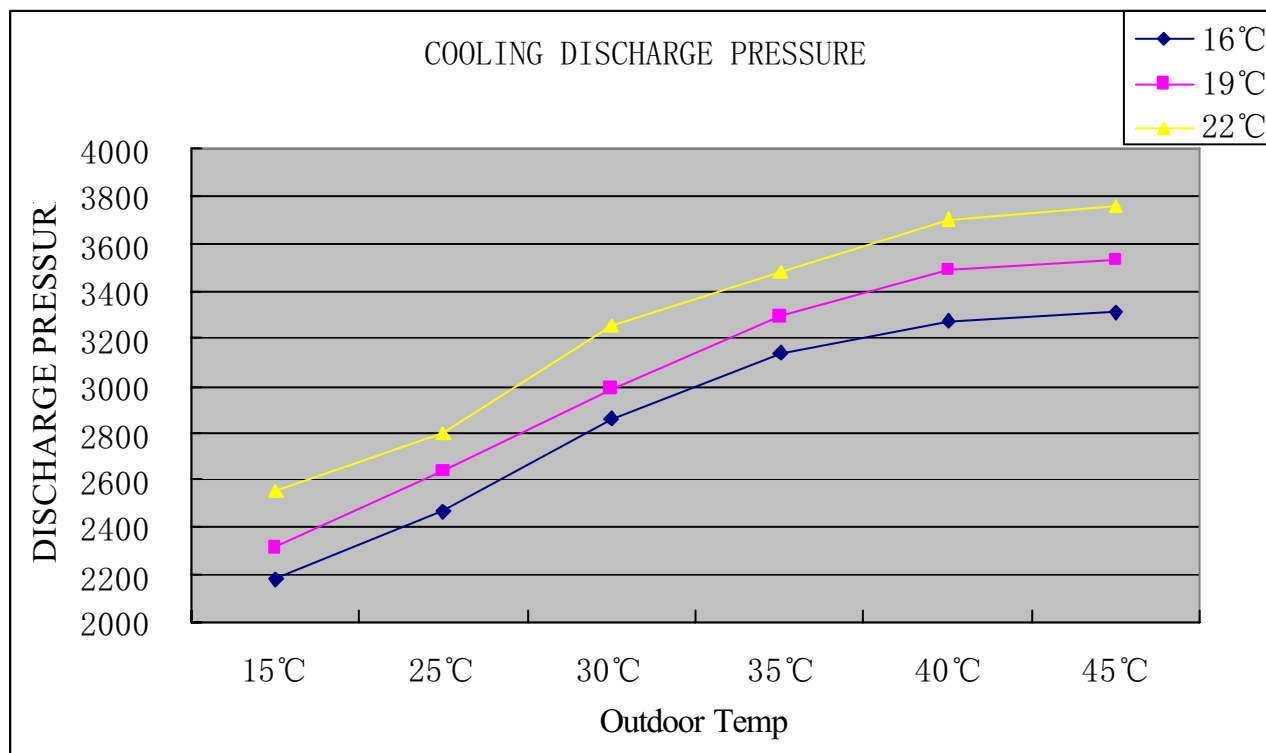
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18℃	20℃	25℃	32℃	35℃	40℃	43℃	46℃
18/12℃	7.63	7.94	8.05	8.28	9.92	10.15	9.45	8.75
18/14℃	7.77	7.98	8.43	8.92	10.17	10.63	9.65	9.18
20/15℃	8.38	8.72	8.95	9.55	11.03	11.54	10.51	10.00
22/16℃	8.81	9.18	9.56	10.09	11.63	12.30	11.08	10.50
25/18℃	9.65	9.95	10.27	10.60	12.18	12.82	11.84	11.27
27/19℃	10.18	10.50	11.00	11.39	13.01	13.42	12.49	11.97
30/22℃	10.41	10.69	11.28	11.72	13.18	13.50	12.65	12.10
32/23℃	10.46	10.78	11.32	11.70	13.26	13.70	12.74	12.18
32/24℃	10.46	10.78	11.37	11.81	13.50	13.78	12.82	12.16



6.4.1 Cooling discharge pressure curves

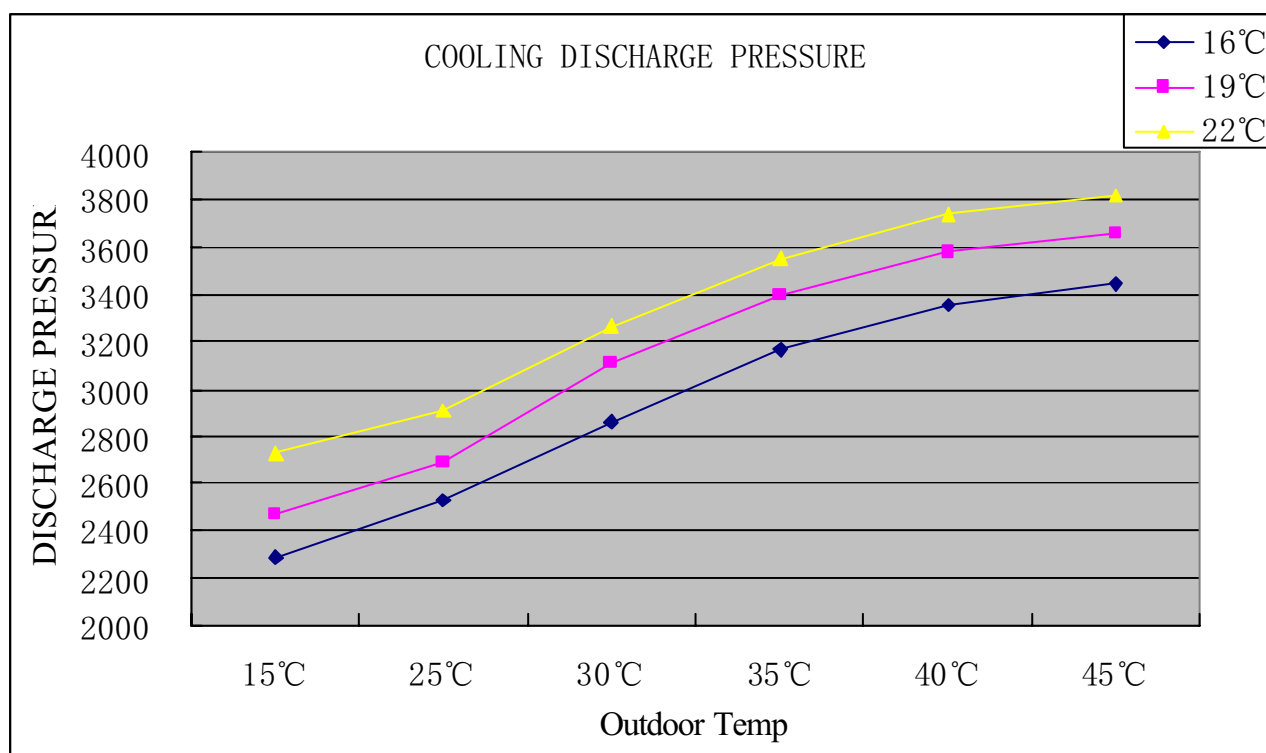
HSU-09HSA03/R2(DB)

Cooling discharge pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	16℃	19℃	22℃
15℃	2183	2315	2560
25℃	2469	2640	2800
30℃	2864	2990	3260
35℃	3143	3290	3480
40℃	3275	3490	3700
45℃	3311	3531	3760



HSU-12HSA03/R2(DB)

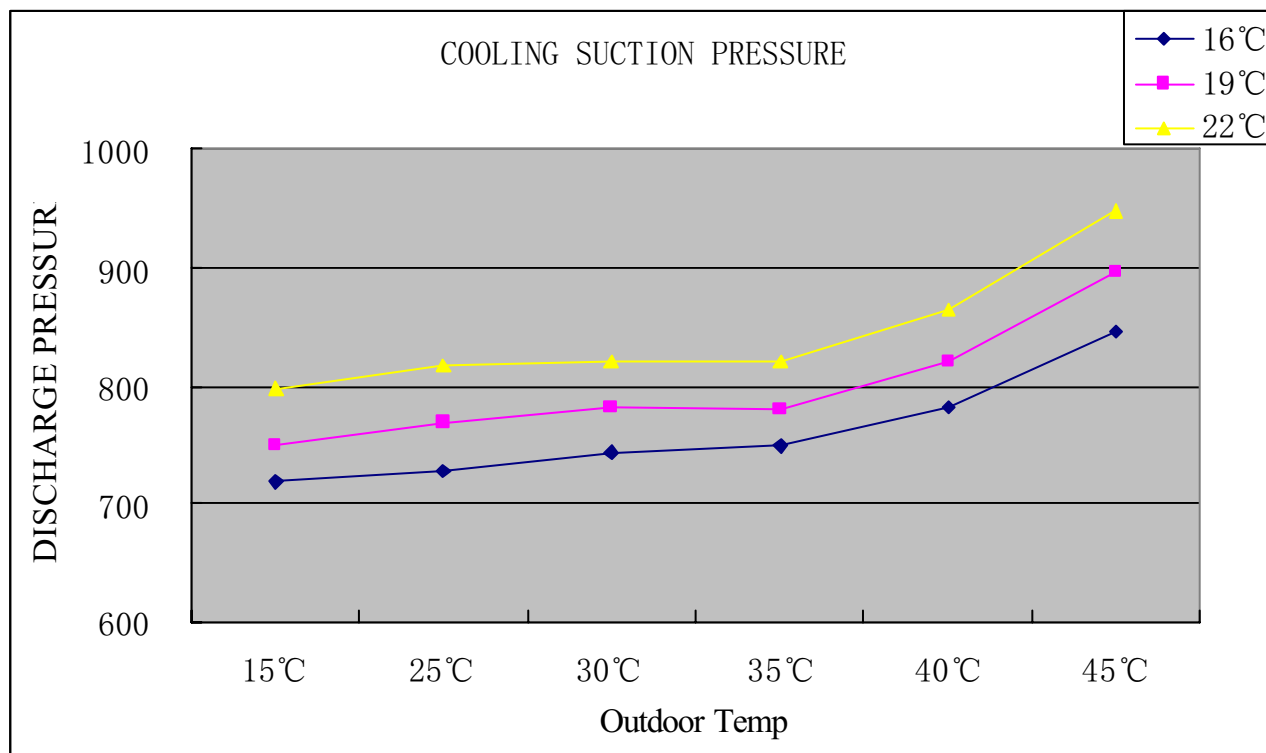
Cooling discharge pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	16℃	19℃	22℃
15℃	2286	2469	2725
25℃	2530	2689	2908
30℃	2864	3114	3267
35℃	3165	3400	3553
40℃	3355	3575	3744
45℃	3440	3663	3824



6.4.2 Cooling suction pressure curves

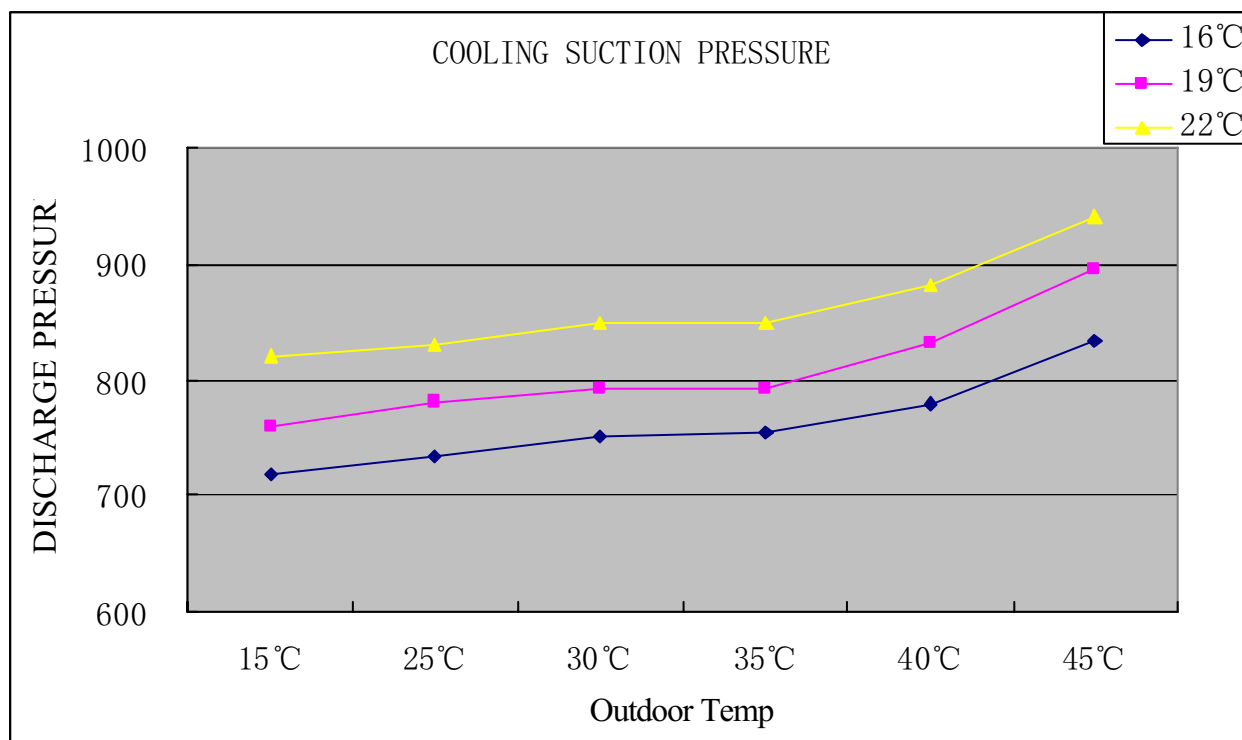
HSU-09HSA03/R2(DB)

Cooling suction pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	16℃	19℃	22℃
15℃	718	749	798
25℃	727	768	817
30℃	744	782	820
35℃	749	779	820
40℃	782	821	864
45℃	846	896	948



HSU-12HSA03/R2(DB)

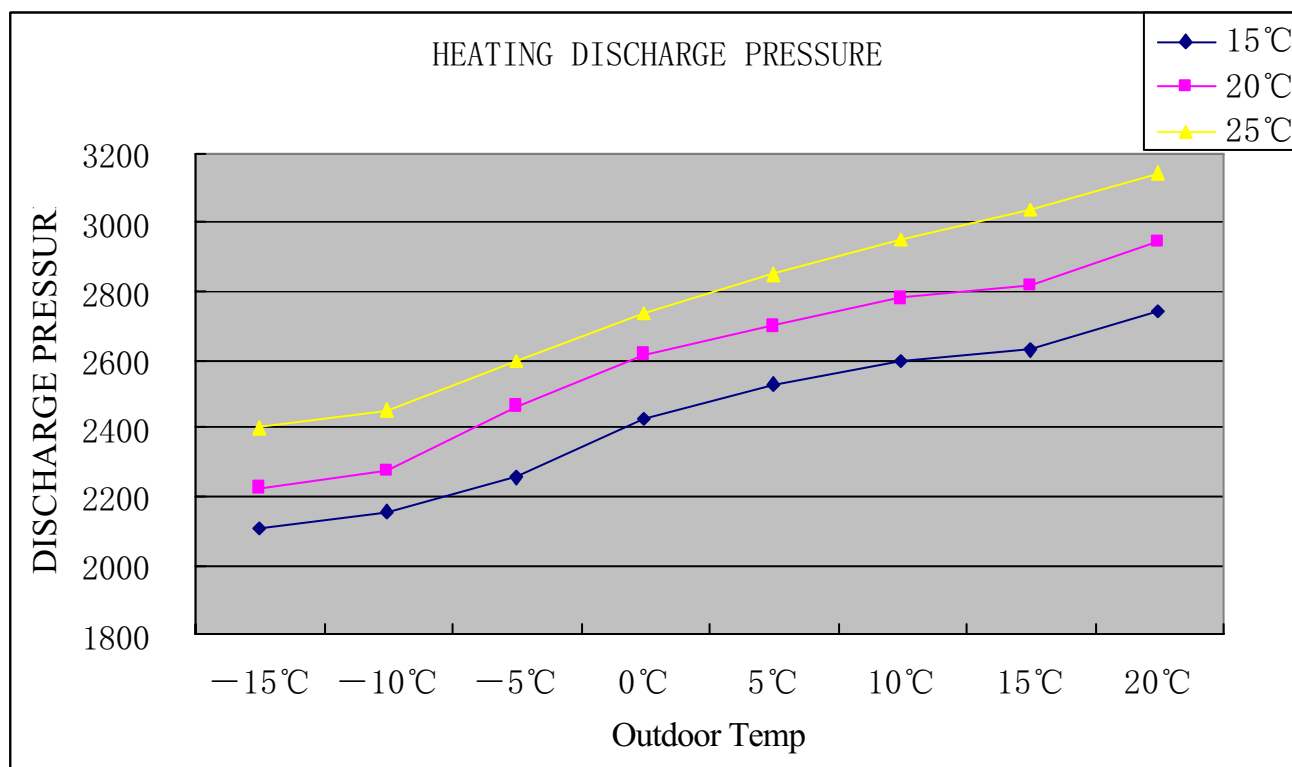
Cooling suction pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	16℃	19℃	22℃
15℃	718	760	821
25℃	735	782	830
30℃	751	792	849
35℃	755	792	849
40℃	780	832	881
45℃	834	896	940



6.4.3 Heating discharge pressure curves

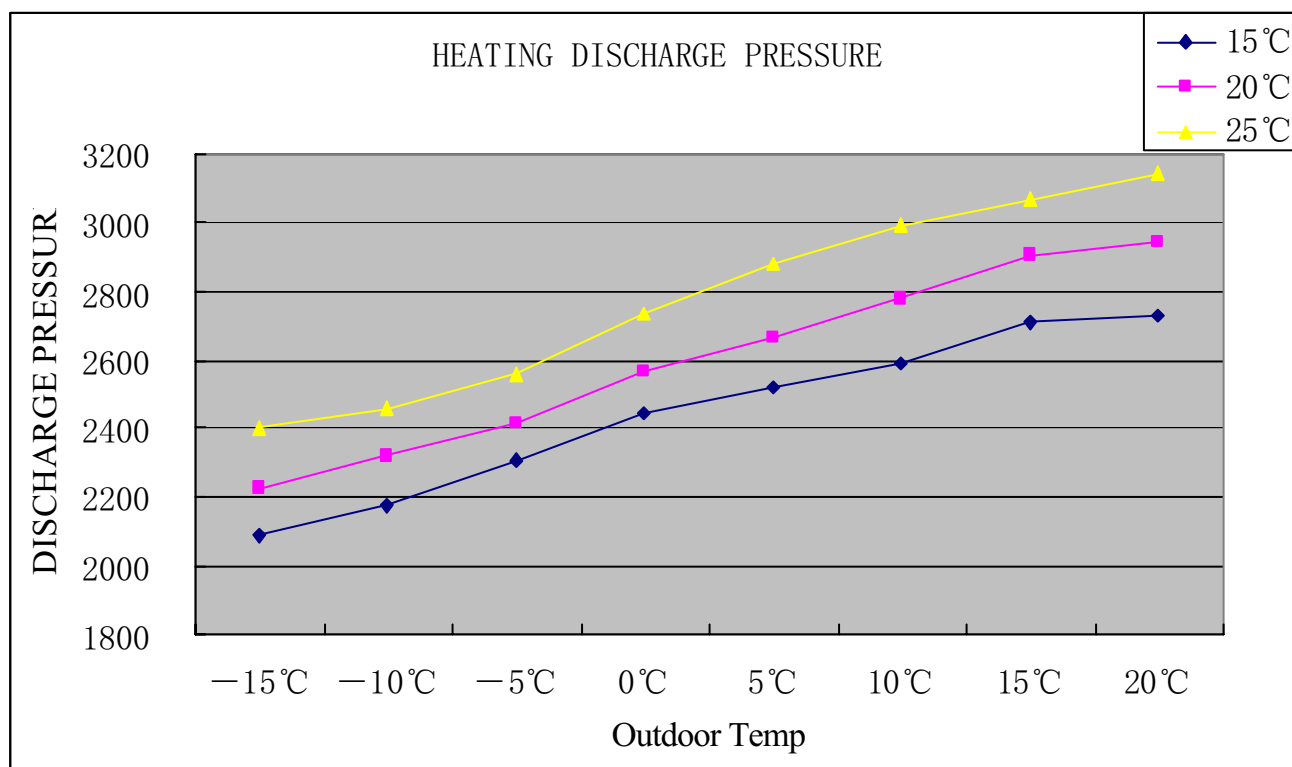
HSU-09HSA03/R2(DB)

Heating discharge pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	15℃	20℃	25℃
−15℃	2109	2226	2400
−10℃	2155	2277	2454
−5℃	2256	2467	2600
0℃	2430	2615	2734
5℃	2527	2697	2851
10℃	2595	2779	2952
15℃	2631	2815	3036
20℃	2743	2945	3145



HSU-12HSA03/R2(DB)

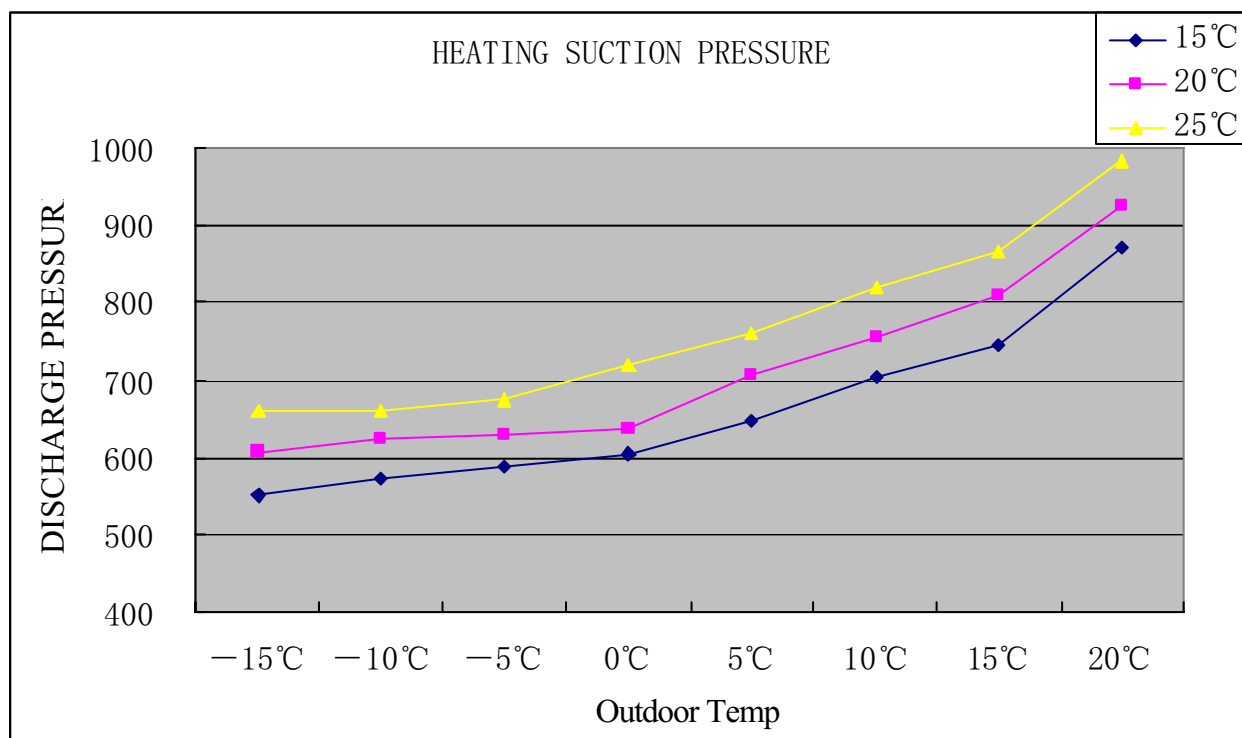
Heating discharge pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	15℃	20℃	25℃
−15℃	2087	2226	2400
−10℃	2179	2320	2462
−5℃	2309	2417	2560
0℃	2446	2569	2734
5℃	2520	2668	2877
10℃	2590	2779	2990
15℃	2713	2903	3067
20℃	2728	2945	3145



6.4.4 Heating suction pressure curves

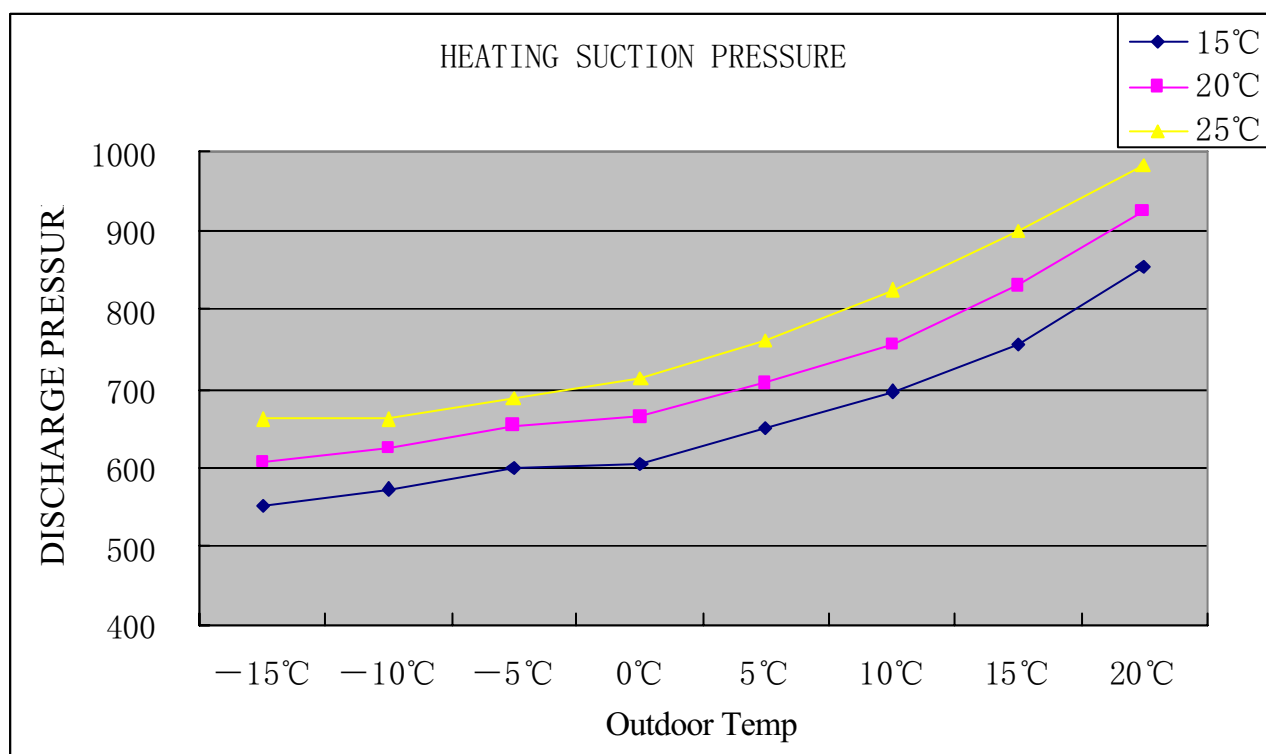
HSU-09HSA03/R2(DB)

Heating suction pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	15℃	20℃	25℃
−15℃	550	607	662
−10℃	571	622	660
−5℃	589	629	675
0℃	605	637	719
5℃	648	708	760
10℃	703	755	820
15℃	745	810	866
20℃	872	924	984



HSU-12HSA03/R2(DB)

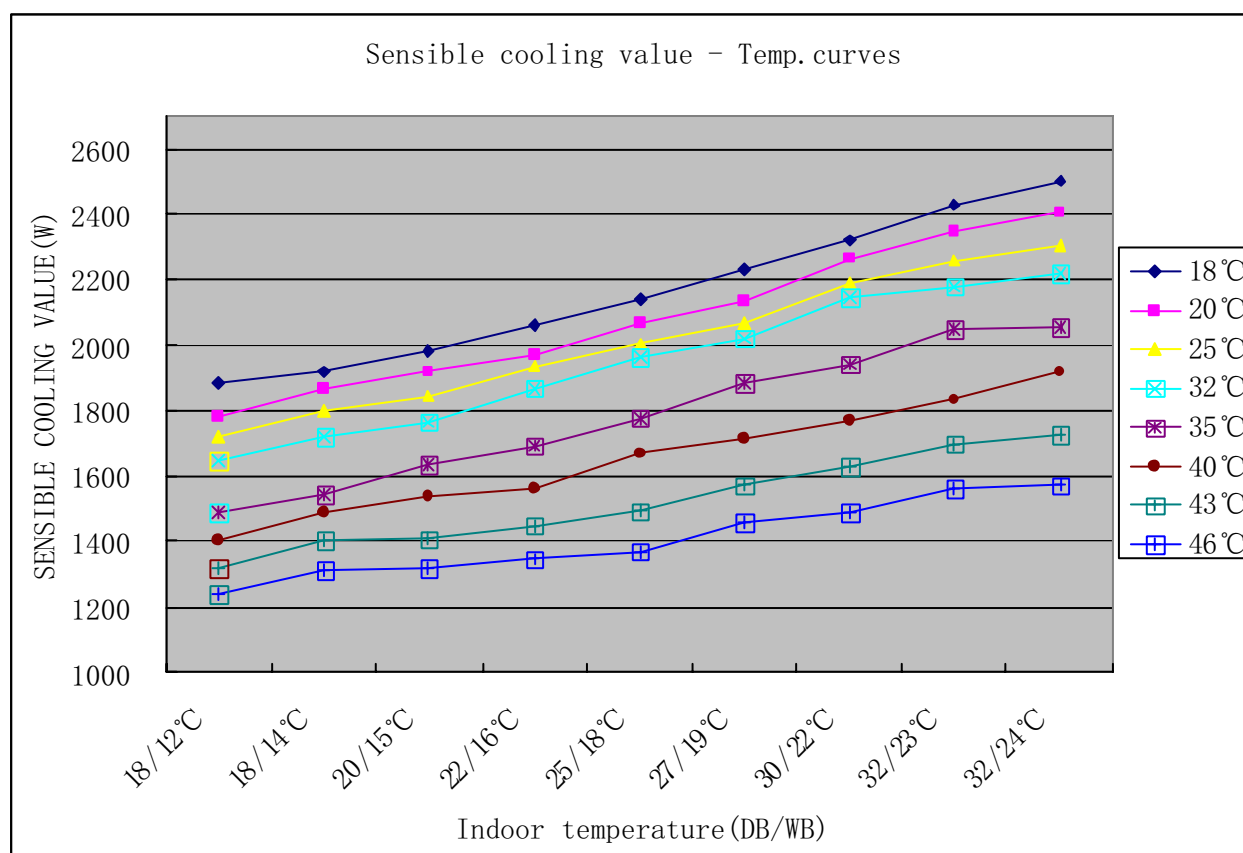
Heating suction pressure table			
Outdoor temp. (Humidity 46%)	Indoor temp.		
DB/WB	15℃	20℃	25℃
−15℃	550	607	660
−10℃	571	622	660
−5℃	600	653	688
0℃	605	664	712
5℃	651	708	760
10℃	695	755	824
15℃	754	831	901
20℃	855	924	984



6.5 Sensible cooling value-temperature curves

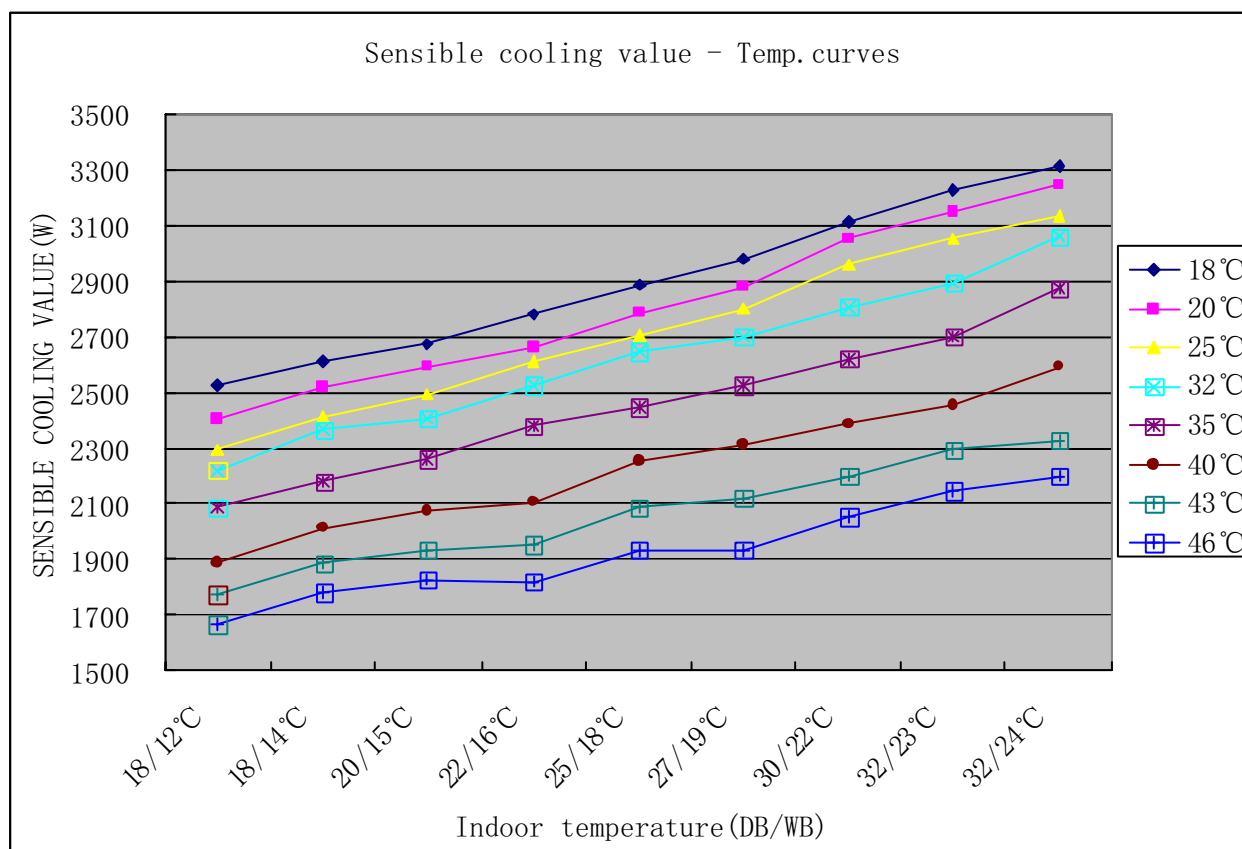
HSU-09HSA03/R2(DB)

Sensible cooling value - Temperature table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18℃	20℃	25℃	32℃	35℃	40℃	43℃	46℃
18/12℃	1885	1783	1720	1647	1489	1400	1315	1236
18/14℃	1917	1866	1800	1720	1545	1489	1400	1310
20/15℃	1982	1920	1845	1764	1634	1536	1408	1315
22/16℃	2061	1969	1935	1870	1691	1562	1445	1347
25/18℃	2137	2066	2003	1961	1774	1667	1491	1366
27/19℃	2232	2132	2063	2020	1885	1713	1570	1459
30/22℃	2320	2261	2192	2147	1941	1769	1630	1486
32/23℃	2430	2348	2260	2181	2051	1834	1699	1562
32/24℃	2501	2404	2302	2218	2056	1920	1723	1574



HSU-12HSA03/R2(DB)

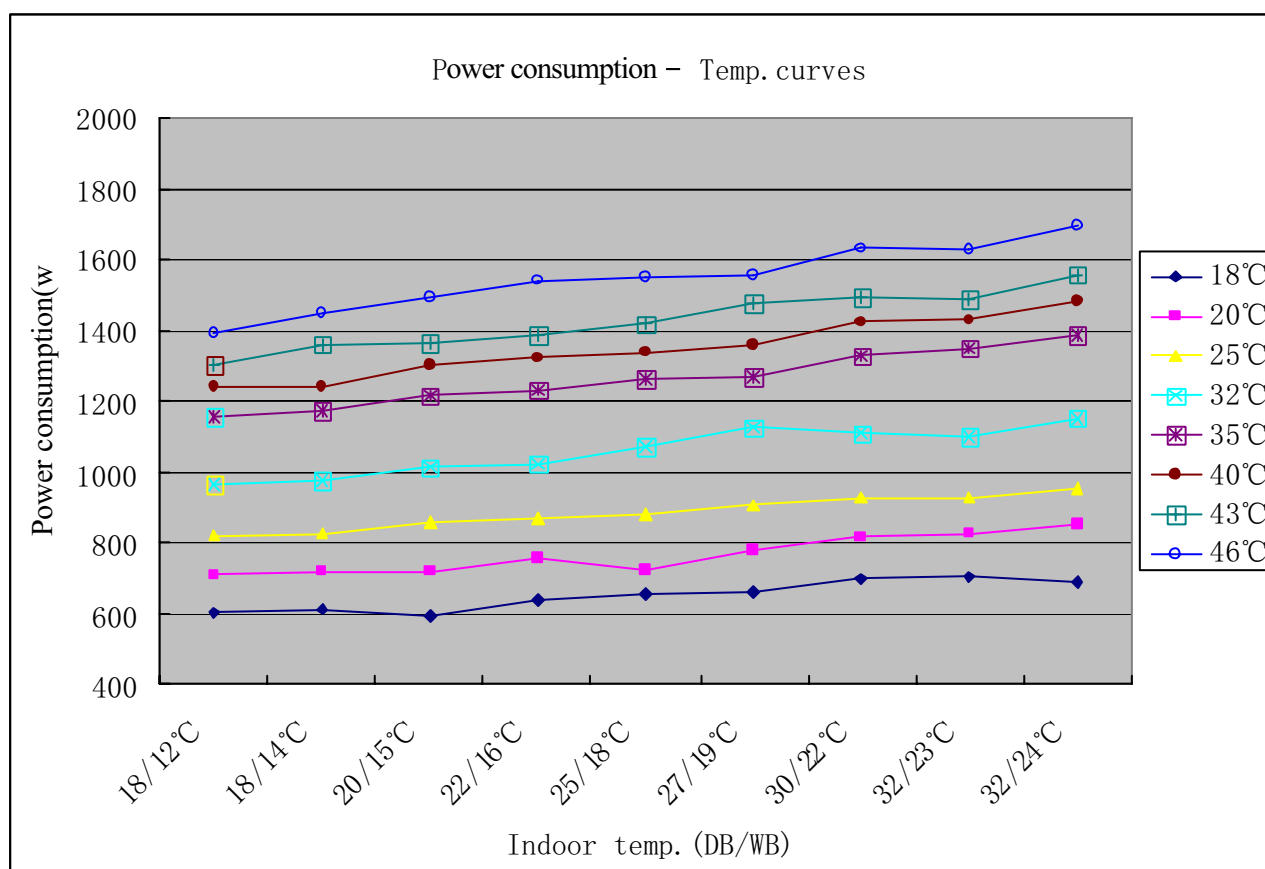
Sensible cooling value - Temperature table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18°C	20°C	25°C	32°C	35°C	40°C	43°C	46°C
18/12°C	2530	2407	2296	2223	2089	1890	1775	1669
18/14°C	2614	2519	2415	2365	2180	2010	1887	1783
20/15°C	2676	2592	2491	2410	2263	2073	1936	1827
22/16°C	2782	2658	2612	2524	2383	2108	1951	1818
25/18°C	2885	2789	2704	2648	2448	2251	2089	1931
27/19°C	2977	2878	2802	2700	2525	2313	2120	1931
30/22°C	3113	3052	2960	2808	2621	2388	2201	2056
32/23°C	3228	3146	3051	2895	2700	2454	2294	2149
32/24°C	3313	3245	3132	3058	2876	2592	2326	2199



6.6 Power consumption-temp. Curves

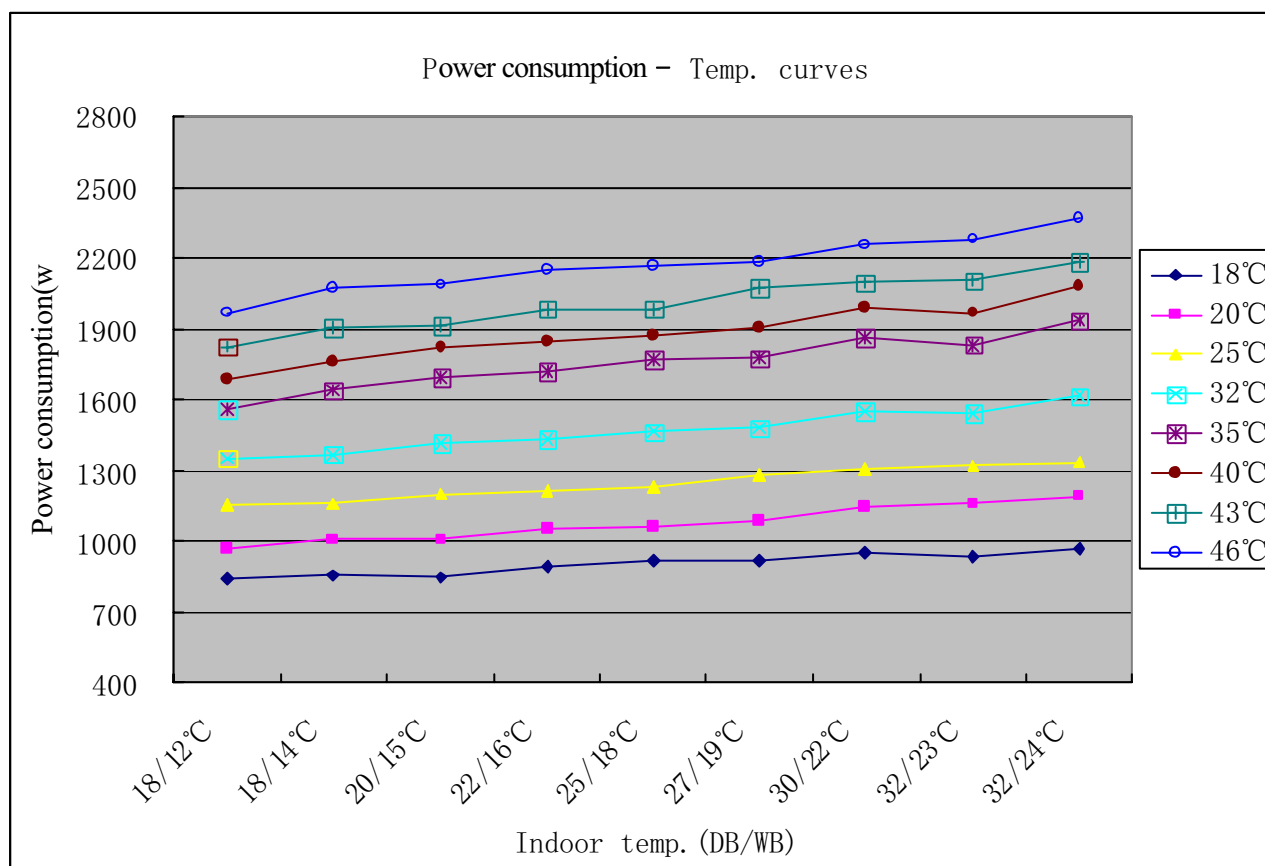
HSU-09HSA03/R2(DB)

Power consumption value - Temp. table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18℃	20℃	25℃	32℃	35℃	40℃	43℃	46℃
18/12℃	602	710	823	963	1156	1240	1300	1392
18/14℃	611	721	827	978	1173	1245	1360	1452
20/15℃	594	720	857	1011	1213	1302	1365	1492
22/16℃	641	756	870	1026	1231	1320	1385	1540
25/18℃	657	723	880	1074	1261	1337	1419	1551
27/19℃	663	779	905	1125	1267	1360	1480	1558
30/22℃	701	817	930	1107	1329	1426	1495	1633
32/23℃	702	828	926	1101	1348	1431	1487	1625
32/24℃	690	851	956	1154	1384	1485	1557	1694



HSU-12HSA03/R2(DB)

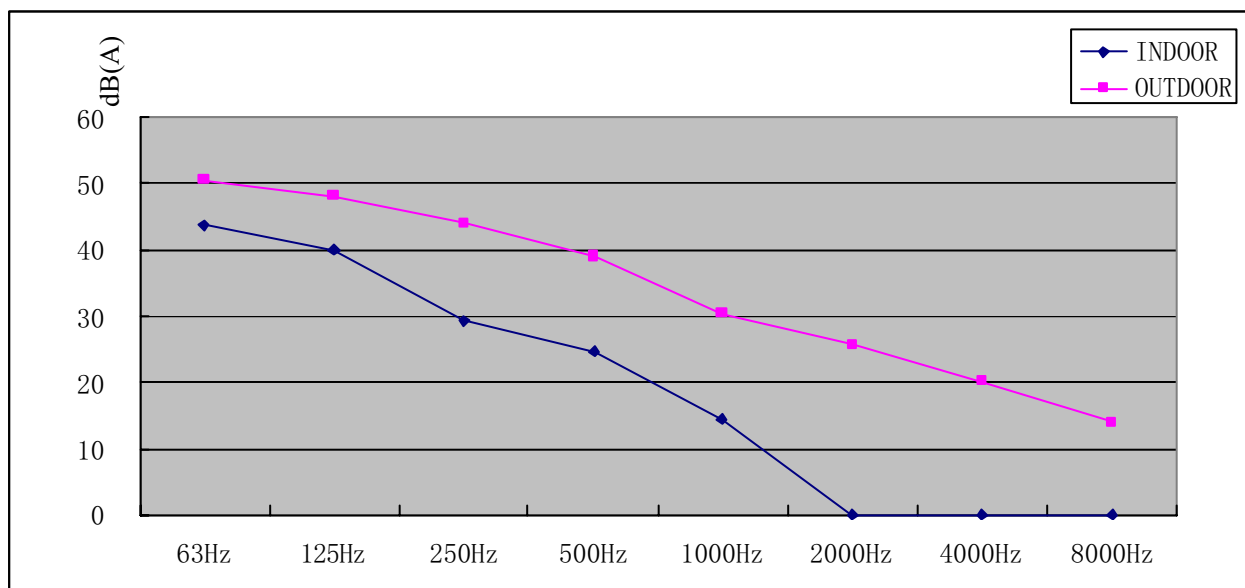
Power consumption value - Temp. table								
Indoor temp.	Outdoor temp. (Humidity 46%)							
DB/WB	18°C	20°C	25°C	32°C	35°C	40°C	43°C	46°C
18/12°C	843	969	1152	1348	1564	1687	1820	1972
18/14°C	855	1009	1158	1369	1642	1762	1904	2072
20/15°C	846	1008	1200	1416	1699	1823	1911	2088
22/16°C	897	1059	1218	1436	1723	1849	1985	2156
25/18°C	920	1066	1232	1467	1766	1872	1987	2171
27/19°C	924	1090	1280	1478	1774	1903	2072	2181
30/22°C	956	1143	1302	1550	1860	1996	2093	2257
32/23°C	940	1160	1319	1541	1830	1971	2108	2282
32/24°C	966	1191	1338	1615	1938	2079	2180	2372



6.7 Noise curves

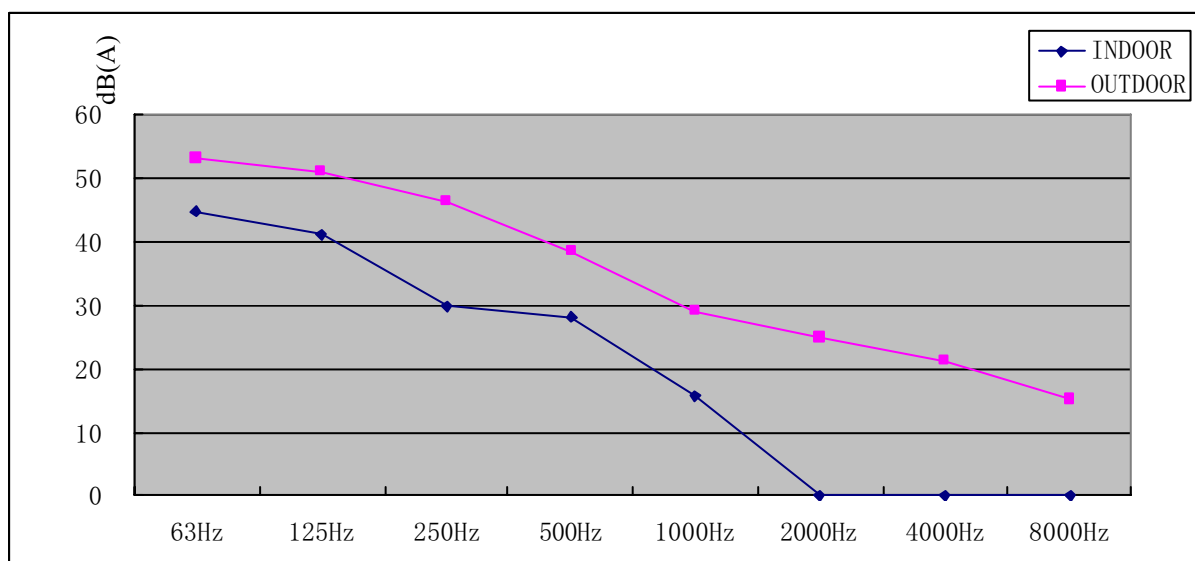
HSU-09HSA03/R2(DB)

NOISE LEVEL	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
INDOOR	44	40	29	25	14	0	0	0
OUTDOOR	51	48	44	39	31	26	20	14



HSU-12HSA03/R2(DB)

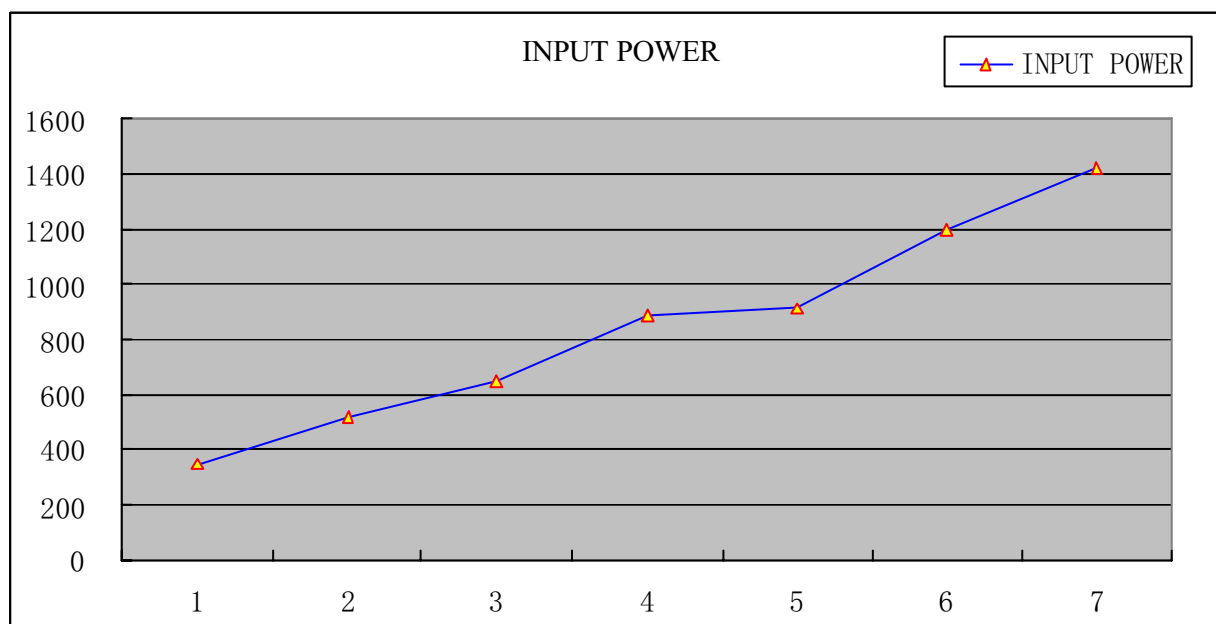
NOISE LEVEL	63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz
INDOOR	45	41	30	28	16	0	0	0
OUTDOOR	53	51	46	39	29	25	21	15



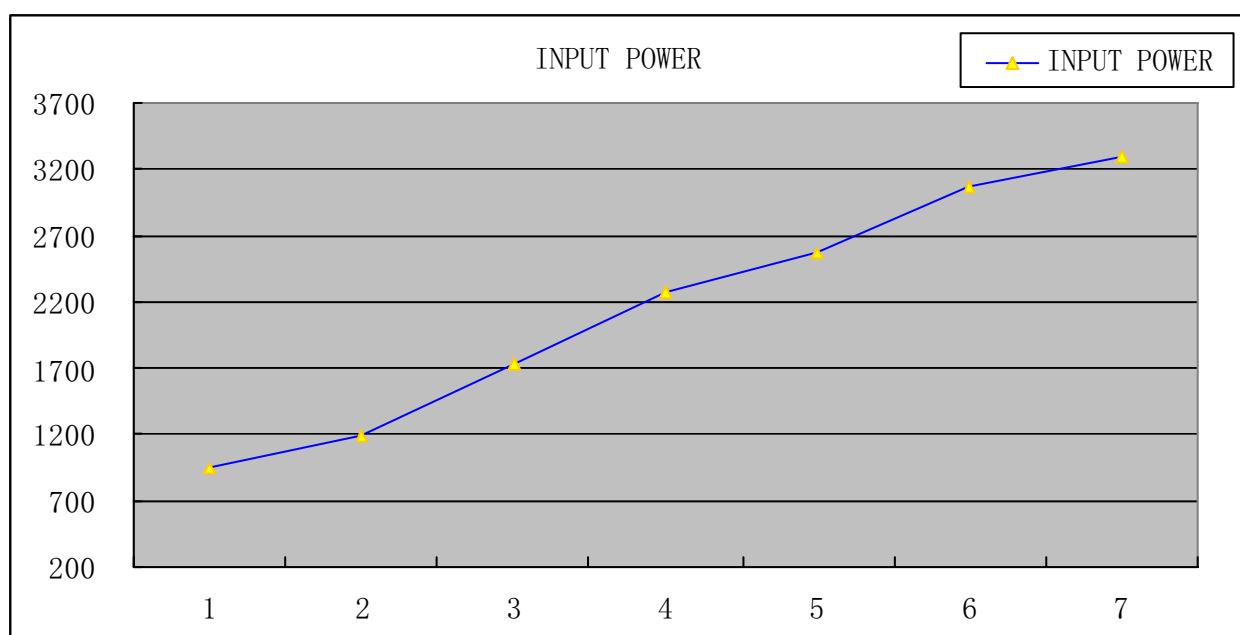
6.8 Compressor performance curves

COMPRESSOR: DA89X1C-20FZ**HSU-09HSA03/R2(DB)**

SERIAL NUMBER	1	2	3	4	5	6	7
FREQUENCY	20	30	40	50	60	70	78
INPUT POWER	346	516	644	888	909	1200	1425

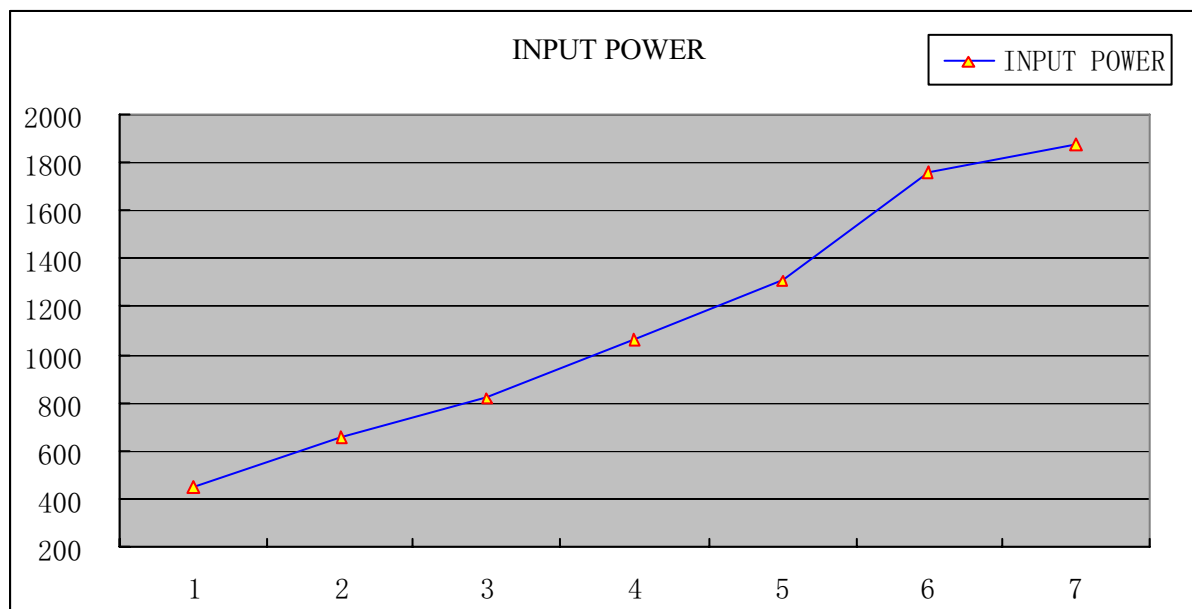


SERIAL NUMBER	1	2	3	4	5	6	7
FREQUENCY	20	30	40	50	60	70	78
INPUT POWER	937	1185	1730	2280	2560	3070	3300

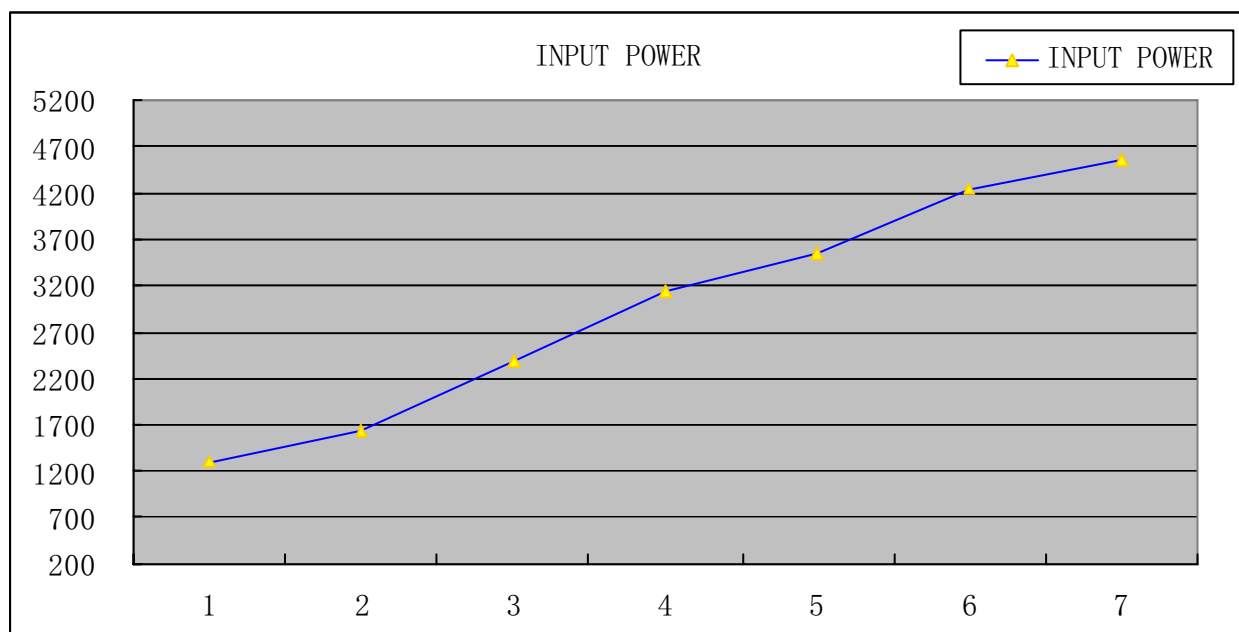


COMPRESSOR: C-6RZ092H1A**HSU-12HSA03/R2(DB)**

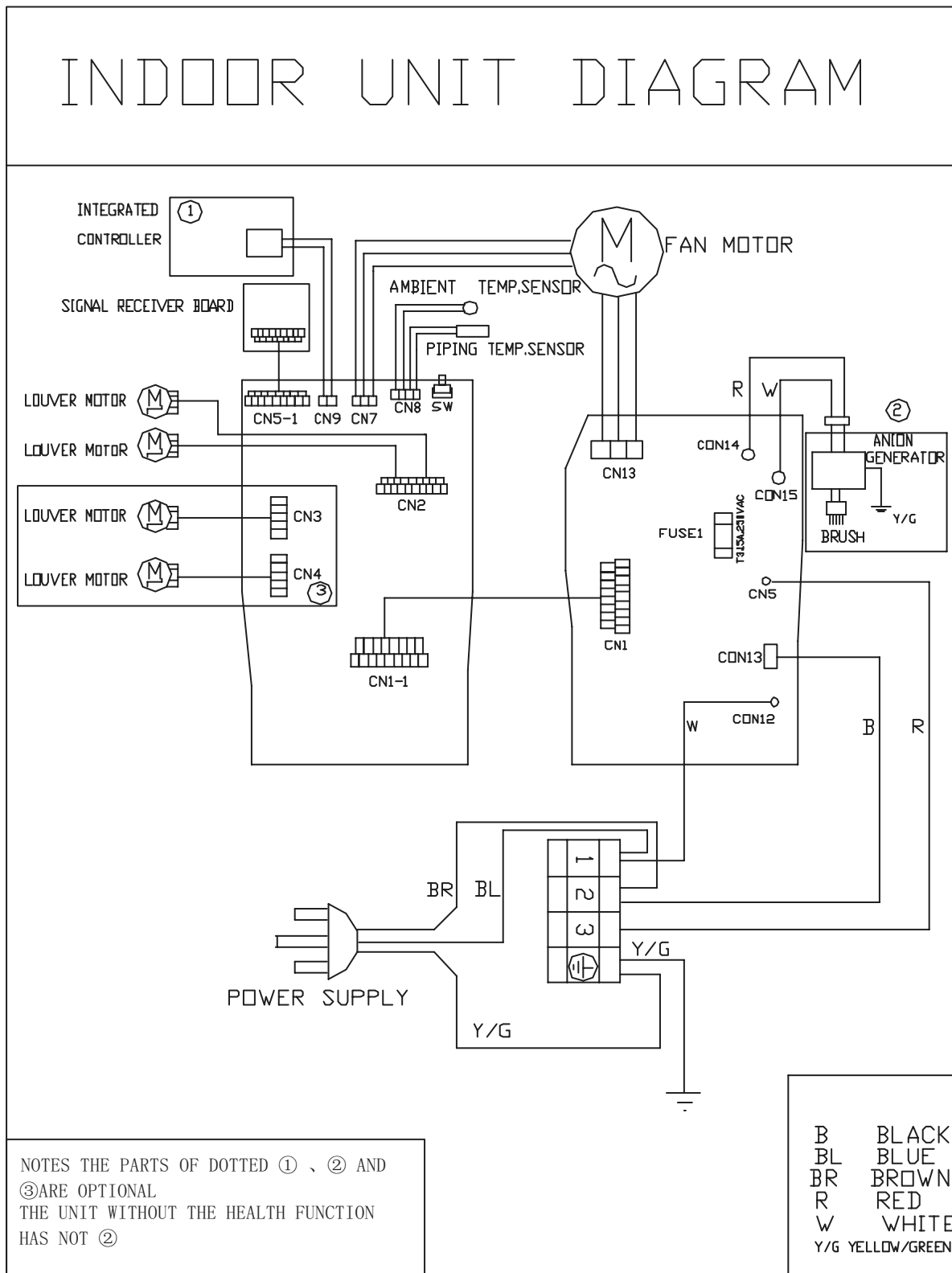
SERIAL NUMBER	1	2	3	4	5	6	7
FREQUENCY	20	30	40	50	60	70	78
INPUT POWER	455	659	821	1065	1309	1760	1877



SERIAL NUMBER	1	2	3	4	5	6	7
FREQUENCY	20	30	40	50	60	70	78
INPUT POWER	1293	1635	2387	3146	3533	4237	4554



7. Wiring diagram

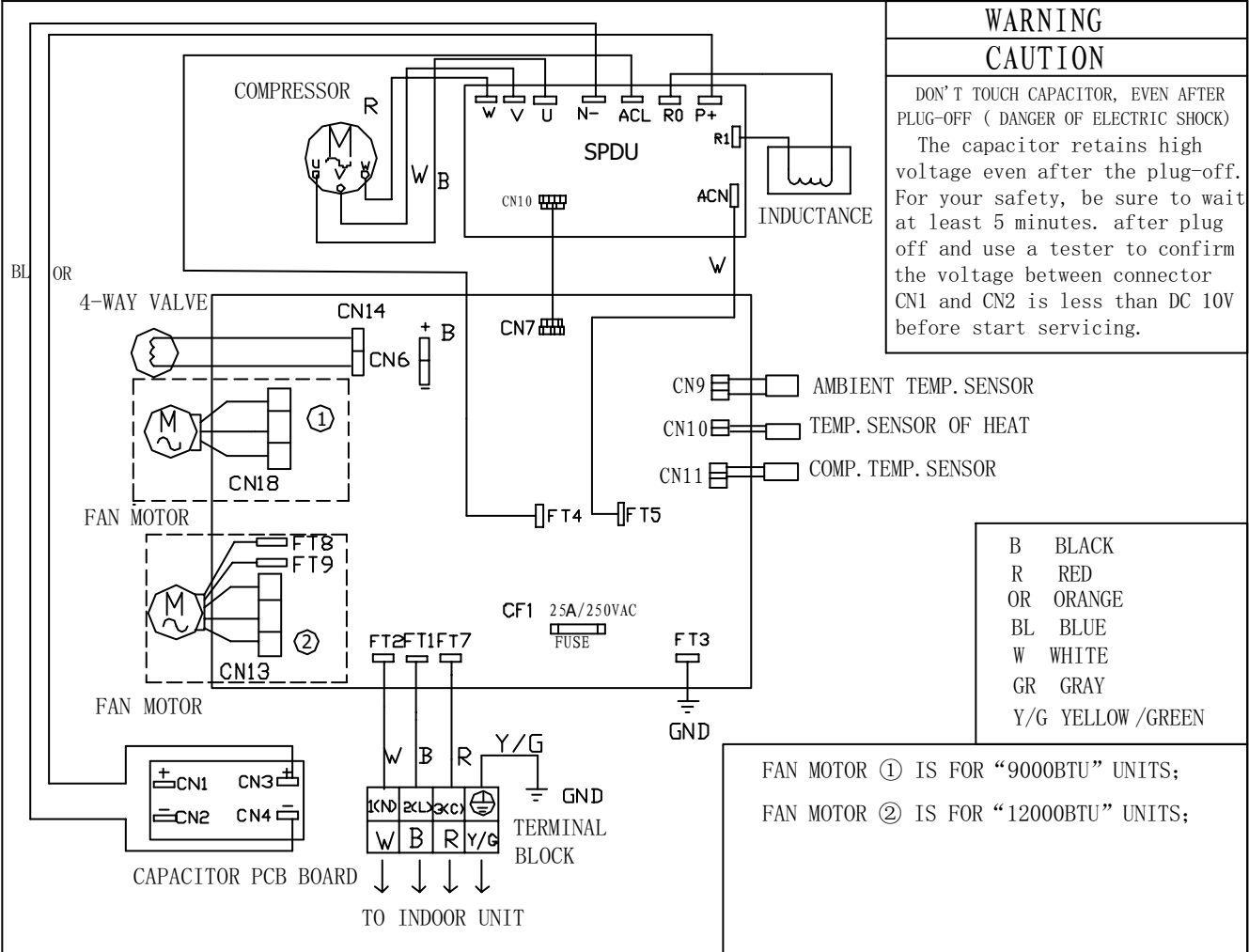


WIRING DIAGRAM OF OUTDOOR UNIT

WARNING

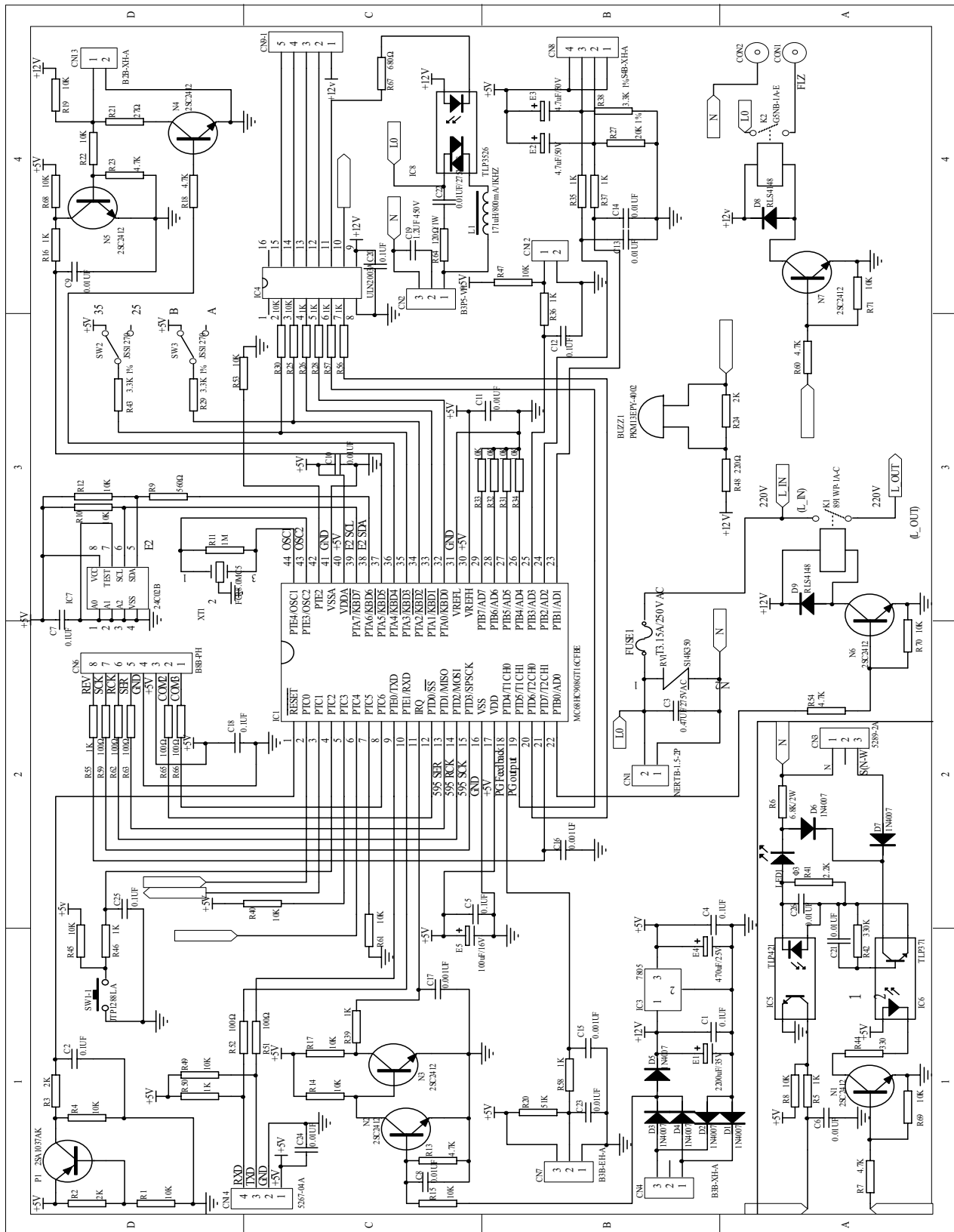
CAUTION

DON'T TOUCH CAPACITOR, EVEN AFTER PLUG-OFF (DANGER OF ELECTRIC SHOCK)
The capacitor retains high voltage even after the plug-off. For your safety, be sure to wait at least 5 minutes. after plug off and use a tester to confirm the voltage between connector CN1 and CN2 is less than DC 10V before start servicing.



10.3 Circuit Diagram

Indoor unit



Installation Manual of Room Air Conditioner

- Read this manual before installation
- Explain sufficiently the operating means to the user according to this manual.

Necessary Tools for Installation

- | | | | |
|---------------------------|---------------------------------|--|-----------|
| 1.Driver | 5.Torque wrench(17mm,22mm,26mm) | 9.Nipper | 12.Reamer |
| 2.Hacksaw | 6.Pipe cutter | 10.Gas leakage detector or soap-and-water solution | |
| 3.Hole core drill | 7.Flaring tool | 11.Measuring tape | |
| 4.Spanner(17,19 and 26mm) | 8.Knife | | |

Drawing for the installation of indoor and outdoor units

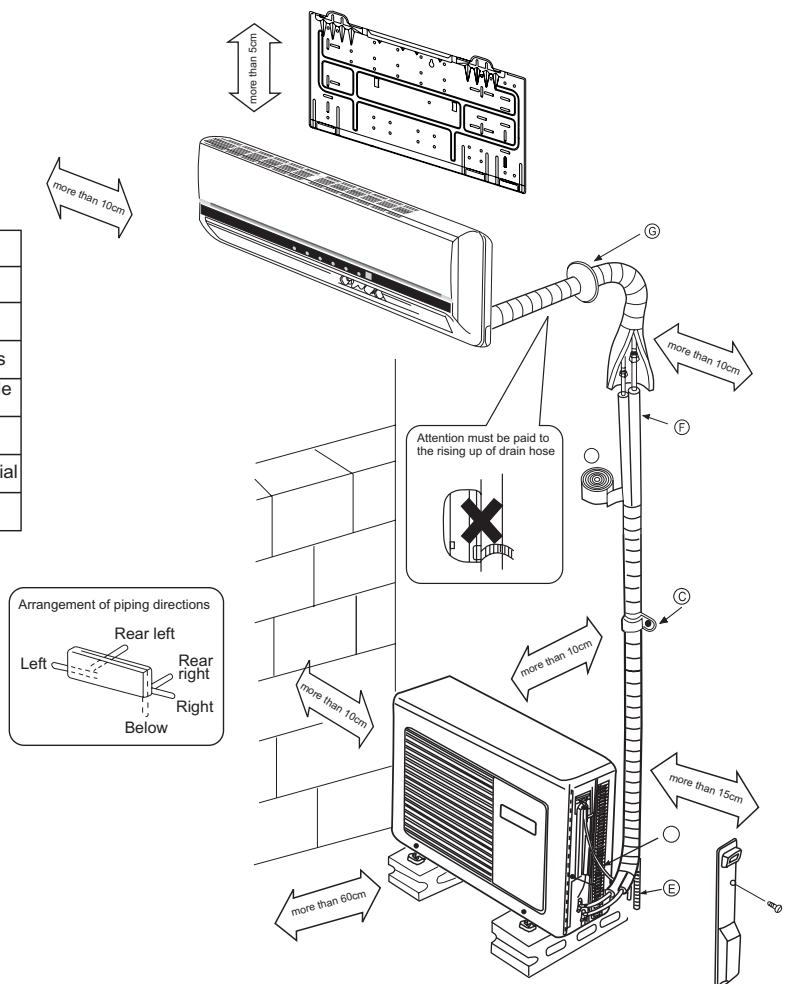
The models adopt HFC free refrigerant R410A

Accessory parts

No.	Accessory parts	Number of articles
①	Remote controller	1
②	R-03 dry battery	2
③	Mounting plate	1
④	Drain hose	1
⑤	Φ4X25 Screw Plastic cap	4
⑥	Drain-elbow	1
⑦	Cushion	4

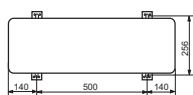
Optional parts for piping

Mark	Parts name
Ⓐ	Non-adhesive tape
Ⓑ	Adhesive tape
Ⓒ	Saddle(L.S) with screws
Ⓓ	Connecting electric cable for indoor and outdoor
Ⓔ	Drain hose
Ⓕ	Heating insulating material
Ⓖ	Piping hole cover

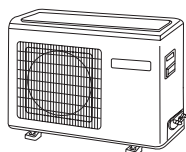


※ The marks from Ⓐ to Ⓖ in the figure are the parts numbers.

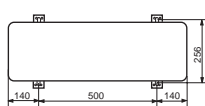
※ The distance between the indoor unit and the floor should be more than 2m.



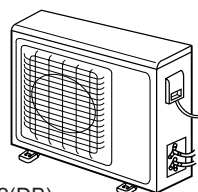
Floor fixing dimensions
of the outdoor unit
(Unit:mm)



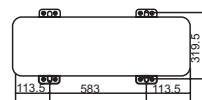
HSU-09HSA03/R2(DB)
HSU-12HSA03/R2(DB)



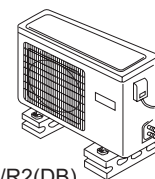
Floor fixing dimensions
of the outdoor unit
(Unit:mm)



HSU-18HSA03/R2(DB)



Floor fixing dimensions
of the outdoor unit
(Unit:mm)



HSU-22HSA03/R2(DB)

Fixing of outdoor unit

- Fix the unit to concrete or block with bolts($\phi 10\text{mm}$) and nuts firmly and horizontally.
- When fitting the unit to wall surface, roof or rooftop, fix a supporter surely with nails or wires in consideration of earthquake and strong wind.
- If vibration may affect the house, fix the unit by attaching a vibration-proof mat.

Indoor Unit

Selection of Installation Place

Outdoor Unit

- Place, robust not causing vibration, where the body can be supported sufficiently.
- Place, not affected by heat or steam generated in the vicinity, where inlet and outlet of the unit are not disturbed.
- Place, possible to drain easily, where piping can be connected with the outdoor unit.
- Place, where cold air can be spread in a room entirely.
- Place, nearby a power receptacle, with enough space around. (Refer to drawings).
- Place where the distance of more than 1m from televisions, radios, wireless apparatuses and fluorescent lamps can be left.
- In the case of fixing the remote controller on a wall, place where the indoor unit can receive signals when the fluorescent lamps in the room are lightened.
- Place, which is less affected by rain or direct sunlight and is sufficiently ventilated.
- Place, possible to bear the unit, where vibration and noise are not increased.
- Place, where discharged wind and noise do not cause a nuisance to the neighbors.
- Place, where a distance marked \leftrightarrow is available as illustrated in the above figure.

Power Source

- Before inserting power plug into receptacle, check the voltage without fail. The power source is the same as the corresponding name plate.
- Install an exclusive branch circuit of the power.
- A receptacle shall be set up in a distance where the power cable can be reached. Do not extend the cable by cutting it.

Selection of pipe

- To this unit, both liquid and gas pipes shall be insulated as they become low temperature in operation.
- Use optional parts for piping set or pipes covered with equivalent insulation material.
- The thickness of the pipe must be 0.8mm at least.

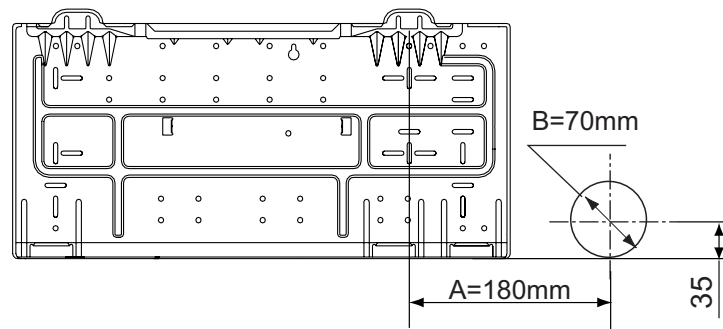
	For 09	For 12,18,22
Liquid pipe (ϕ)	6.35mm(1/4")	6.35mm(1/4")
Gas pipe (ϕ)	9.52mm(3/8")	12.7mm(1/2")

Indoor unit

1. Fitting of the Mounting Plate and Positioning of the wall Hole

When the mounting plate is first fixed

1. Carry out, based on the neighboring pillars or lintels, a proper leveling for the plate to be fixed against the wall, then temporarily fasten the plate with one steel nail.
2. Make sure once more the proper level of the plate, by hanging a thread with a weight from the central top of the plate, then fasten securely the plate with the attachment steel nail.
3. Find the wall hole location A using a measuring tape



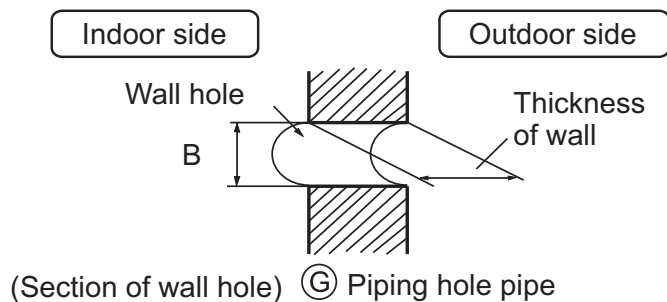
Find the level position

When the mounting plate is fixed side bar and lintel

- Fix to side bar and lintel a mounting bar, Which is separately sold, and then fasten the plate to the fixed mounting bar.
- Refer to the previous article, " **When the mounting plate is first fixed** ", for the position of wall hole.

2. Making a Hole on the Wall and Fitting the Piping Hole Cover

- Make a hole of B mm in diameter, slightly descending to outside the wall.
- Install piping hole cover and seal it off with putty after installation



Indoor unit

3. Installation of the Indoor Unit

Drawing of pipe

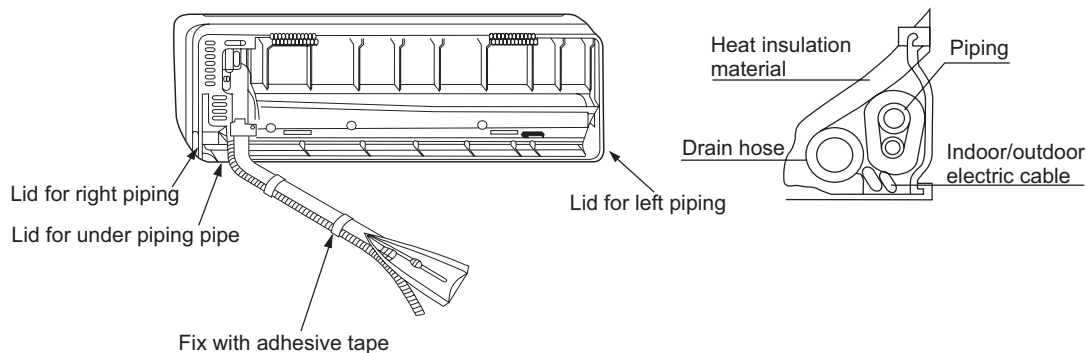
[Rear piping]

- Draw pipes and the drain hose, then fasten them with the adhesive tape

[Left • Left-rear piping]

- In case of left side piping, cut away, with a nipper, the lid for left piping.
- In case of left-rear piping, bend the pipes according to the piping direction to the mark of hole for left-rear piping which is marked on heat insulation materials.
 1. Insert the drain hose into the dent of heat insulation materials of indoor unit.
 2. Insert the indoor/outdoor electric cable from backside of indoor unit, and pull it out on the front side, then connect them.
 3. Coat the flaring seal face with refrigerant oil and connect pipes.

Cover the connection part with heat insulation materials closely, and make sure fixing with adhesive tape



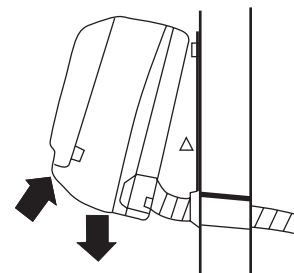
- Indoor/outdoor electric cable and drain hose must be bound with refrigerant piping by protecting tape.

[Other direction piping]

- Cut away, with a nipper, the lid for piping according to the piping direction and then bend the pipe according to the position of wall hole. When bending, be careful not to crash pipes.
- Connect beforehand the indoor/outdoor electric cable, and then pull out the connected to the heat insulation of connecting part specially.

Fixing the indoor unit body

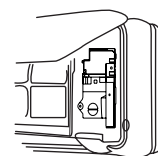
- Hang surely the unit body onto the upper notches of the mounting plate. Move the body from side to side to verify its secure fixing.
- In order to fix the body onto the mounting plate, hold up the body aslant from the underside and then put it down perpendicularly.



4. Connecting the indoor/outdoor Electric Cable

Removing the wiring cover

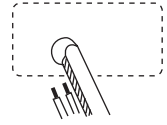
- Remove terminal cover at right bottom corner of indoor unit, then take off wiring cover by removing its screws.



Indoor unit

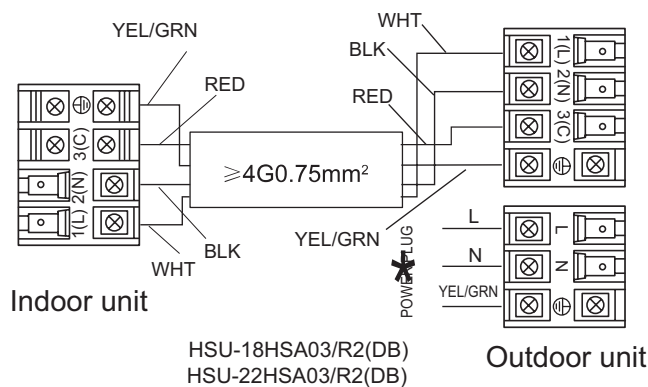
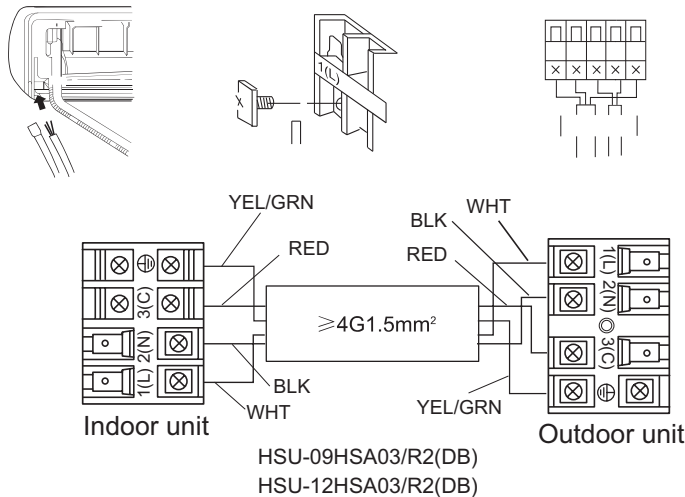
When connecting the cable after installing the indoor unit

1. Insert from outside the room cable into left side of the wall hole, in which the pipe has already existed.
2. Pull out the cable on the front side, and connect the cable making a loop.



When connecting the cable before installing the indoor unit

- Insert the cable from the back side of the unit, then pull it out on the front side.
 - Loosen the screws and insert the cable ends fully into terminal block, then tighten the screws.
 - Pull the cable slightly to make sure the cables have been properly inserted and tightened.
 - After the cable connection, never fail to fasten the connected cable with the wiring cover.
 - Note: When connecting the cable, confirm the terminal number of indoor and outdoor units carefully. If wiring is not correct, proper operation can not be carried out and will cause defect.
1. If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similar qualified person. The type of connecting wire is H05RN-F or H07RN-F.
 2. If the fuse on PC board is broken please change it with the type of T. 3.15A/250V.
 3. The wiring method should be in line with the local wiring standard.
 4. After installation, the power plug should be easily reached.
 5. A breaker should be incorporated into fixed wiring. The breaker should be all-pole switch and the distance between its two contacts should be not less than 3mm.



Power cable:

- mod 09-12: $\geq 3G1.5mm^2$
- mod 18-22: $\geq 3G2.5mm^2$

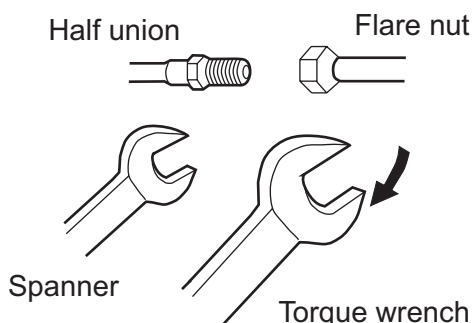
Outdoor unit

1. Installation of Outdoor Unit

Install according to Drawing for the installation of indoor and outdoor units

2. Connection of pipes

- To bend a pipe, give the roundness as large as possible not to crush the pipe, and the bending radius should be 30 to 40 mm or longer.
- Connecting the pipe of gas side first makes working easier.
- The connection pipe is specialized for R410A.
- The max vertical distance between the indoor unit and the outdoor unit is 5 m.



Forced fastening without careful centering may damage the threads and cause a leakage of gas.

Pipe Diameter (ϕ)	Fastening torque
Liquid side 6.35mm(1/4")	18N.m
Gas side 9.52mm(3/8")	42N.m
Gas side 12.7mm(1/2")	55N.m

Be careful that matters, such as wastes of sands, etc. shall not enter the pipe.

The standard pipe length is 5m. If it is over 5m, the function of the unit will be affected. If the pipe has to be lengthened, the refrigerant should be charged, according to 20 g/m. But the charge of refrigerant must be conducted by professional air conditioner engineer. Before adding additional refrigerant, perform air purging from the refrigerant pipes and indoor unit using a vacuum pump, then charge additional refrigerant.

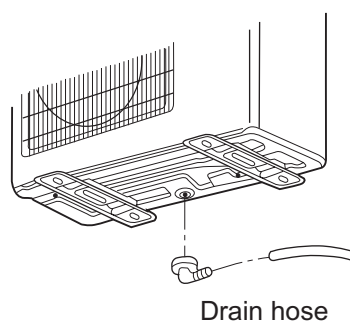
3. Connection

- Use the same method on indoor unit. Loosen the screws on terminal block and insert the plugs fully into terminal block, then tighten the screws.
- Insert the cable according to terminal number in the same manner as the indoor unit.
- If wiring is not correct, proper operation can not be carried out and controller may be damaged.
- Fix the cable with a clamp.

4. Attaching Drain-Elbow

- If the drain-elbow is used, please attach it as figure.

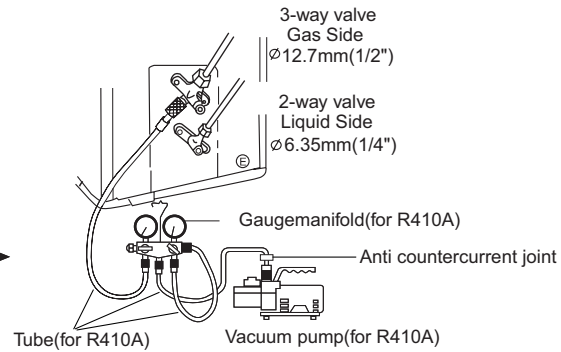
Note: Only for heat pump unit.



Outdoor unit

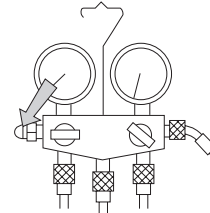
5. Purging Method: To use vacuum pump

① Detach the service port's cap of 3-way valve, the valve rod's cap for 2-way valve and 3-way's, connect the service port into the projection of charge hose (low) for gaugemanifold. Then connect the projection of charge hose (center) for gaugemanifold into vacuum pump.



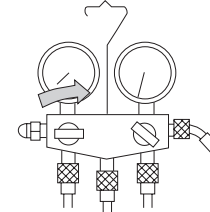
② Open the handle at low in gaugemanifold, operate vacuum pump. If the scale-moves of gauge (low) reach vacuum condition in a moment, check ① again.

② Open

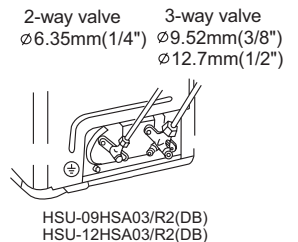
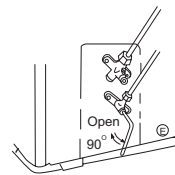


③ Vacuumize for over 15min. And check the level gauge which should read -0.1 MPa (-76 cm Hg) at low pressure side. After the completion of vacuumizing, close the handle 'Lo' in gaugemanifold and stop the operation of the vacuum pump. Check the condition of the scale and hold it for 1-2min. If the scale-moves back in spite of tightening, make flaring work again, the return to the beginning of ③.

③ Close



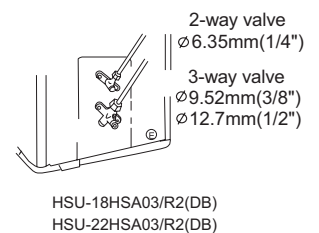
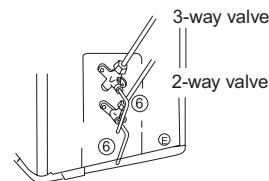
④ Open the valve rod for the 2-way valve to an angle of anticlockwise 90 degrees. After 6 seconds, close the 2-way valve and make the inspection of gas leakage.



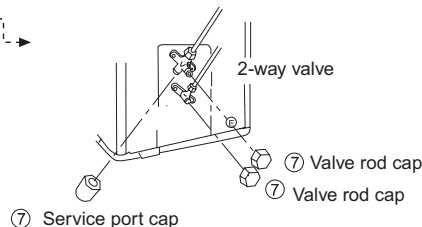
⑤ No gas leakage? In case of gas leakage, tighten parts of pipe connection. If leakage stops, then proceed ⑥

If it does not stop gas leakage, discharge whole refrigerants from the service port. After flaring work again and vacuumize, fill up prescribed refrigerant from the gas cylinder

⑥ Detach the charge hose from the service port, open 2-way valve and 3-way. Turn the valve rod anticlockwise until hitting lightly.



⑦ To prevent the gas leakage, turn the service port's cap, the valve rod's cap for 2-way valve and 3-way's a little more than the point where the torque increases suddenly.



⑧ After attaching the each caps, check the gas leakage around the caps.

CAUTION:

1.If the refrigerant of the air conditioner leaks, it is necessary to discharge all the refrigerant. Vacuumize first, then charge the liquid refrigerant into air conditioner according to the amount marked on the name plate.

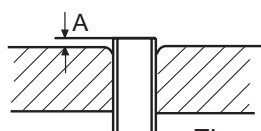
2.Please do not let other cooling medium, except specified one (R410A), or air enter into the cooling circulation system. Otherwise, there will be abnormal high pressure in the system to make it crack and lead to personal injuries.

1.Power Source Installation

- The power source must be exclusively used for air conditioner. (Over 10A)
- In the case of installing an air conditioner in a moist place, please install an earth leakage breaker.
- For installation in other places, use a circuit breaker as far as possible.

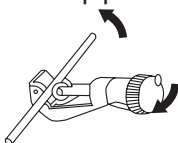
2.Cutting and Flaring Work of Piping

- Pipe cutting is carried out with a pipe cutter and burs must be removed.
- After inserting the flare nut, flaring work is carried out.



Flare tooling die

1.Cut pipe



2.Remove burs



3.Insert the flare nut



4.Flare pipe



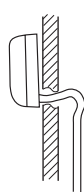
	Flare tool for R410A	Conventional flare tool	
	Clutch-type	clutch-type(Rigid-type)	Wing-nut type (Imperial-type)
A	0~0.5mm	1.0~1.5mm	1.5~2.0mm

Correct	Incorrect				
	Lean	Damage of flare	Crack	Partial	Too outside

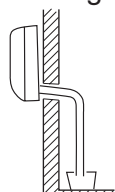
3.On Drainage

Please install the drain hose so as to be downward slope without fail.

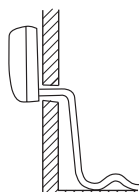
Please don't do the drainage as shown below.



It becomes high midway.



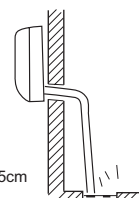
The end is immersed in water.



It waves.



The gap with the ground is too small



There is the bad smell from a ditch

- Please pour water in the drain pan of the indoor unit, and confirm that drainage is carried out surely to outdoor.
- In case that the attached drain hose is in a room, please apply heat insulation to it without fail.

Check for Installation and Test Run

- Please kindly explain to our customers how to operate through the instruction manual.

Check Items for Test Run

☐ Put check mark ✓ in boxes

- | | | |
|--|--|--|
| <input type="checkbox"/> Gas leak from pipe connecting? | <input type="checkbox"/> Is drainage securely carried out? | <input type="checkbox"/> Is the lamp normally lighting? |
| <input type="checkbox"/> Heat insulation of pipe connecting? | <input type="checkbox"/> Is the earth line securely connected? | <input type="checkbox"/> Are cooling and heating (when in heat pump) performed normally? |
| <input type="checkbox"/> Are the connecting wirings of indoor and outdoor firmly inserted to the terminal block? | <input type="checkbox"/> Is the indoor unit securely fixed? | <input type="checkbox"/> Is the operation of room temperature regulator normal? |
| <input type="checkbox"/> Is the connecting wiring of indoor and outdoor firmly fixed? | <input type="checkbox"/> Is power source voltage abided by the code? | |
| | <input type="checkbox"/> Is there any noise? | |

Sincere Forever

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